Gary Shellhorn

UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

FISH AND WILDLIFE COORDINATION ACT REPORT

FALLON INDIAN RESERVATION

IRRIGATION PROJECT

FALLON, NEVADA

REGION ONE

DECEMBER 1987

SERVICE POSITION

The Fallon Paiute-Shoshone Reservation Irrigation Project site is located in Churchill County in west-central Nevada. The purpose of the project is to develop an additional 2,170 acres of irrigated agriculture, and to upgrade and extend the existing irrigation delivery and distribution system. There is evidence that the land proposed for additional agriculture on the Reservation is contaminated. Water from drains recently constructed on this land contains elevated levels of various elements potentially hazardous to fish and wildlife. Water draining this land enters the Stillwater Wildlife Management Area. The project would also place additional water demands upon the Truckee River and Pyramid Lake. For the above reasons, the Service opposes the Proposed Action and Construction alternatives. The only alternative the Service can support is the Land Acquisition alternative. Under this alternative, lands already in production would be acquired and no additional withdrawals would be required from the Truckee River.

Regardless of the alternative implemented, it is recommended that the TJ drain be plugged and that wetland losses and additional Truckee River withdrawals be mitigated for through the purchase and transfer of water rights.

STATE OF NEVADA
DEPARTMENT OF WILDLIFE
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RICHARD H. BRYAN
Governor

February 12, 1987

Mr. Bob Hallock
Fish and Wildlife Service
4600 Kietzke Lane, Building C
Reno, Nevada 89502

RE: Fallon Indian Reservation Irrigation Project - FWS Coordination Report

Dear Bob:

Our agency appreciates the opportunity to review and contribute to the draft coordination report. We find the document comprehensive and accurate regarding the fish and wildlife resources associated with the project.

If there are any questions or need for further input, please advise.

Sincerely,

Sam Millazzo
Regional Supervisor
Region I

FISH AND WILDLIFE COORDINATION ACT REPORT

Fallon Indian Reservation
Irrigation Project
Fallon, Nevada

by

U.S. Fish and Wildlife Service
Division of Ecological Services

Richard J. Navarre, Complex Manager
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Released by
U.S. Fish and Wildlife Service
Great Basin Complex Office
Reno, Nevada

December 1987

LIST OF TABLES

PREFACE

This is a report by the U.S. Fish and Wildlife Service (Service) on the Fallon Indian Reservation Irrigation Project. It is a report of the impacts on fish and wildlife associated with and without the proposed and already completed (unauthorized features) irrigation project features on the Fallon Indian Reservation in Churchill County, Nevada. This report has been prepared under the authority of the Fish and Wildlife Coordination Act, Public Law 85-624 Section 2(b) and in keeping with the spirit and intent of the National Environmental Policy Act. This report has the endorsement of the Nevada Department of Wildlife. This study was authorized by Public Law 95-337 and includes an array of plans which have not been approved for construction, and recently constructed irrigation canals and drains.

The Service evaluated the resources and project impacts based on local and regional habitat scarcity, vulnerability to changes, habitat quality, and feasibility for compensating unavoidable resource degradation and losses. The goals of the Service in this study are: (1) To evaluate the impact of the proposed plan on fish and wildlife populations, their habitat, and their utilization by the public throughout the entire planning area; (2) to identify and evaluate the least environmentally damaging alternative; (3) to recommend methods of mitigating unavoidable fish and wildlife habitat losses; and (4) to recommend methods of enhancing fish and wildlife habitat where feasible.

The Service's findings are based on project data furnished prior to August 1987. The biological data was obtained in cooperation with the Bureau of Reclamation, the Bureau of Indian Affairs, and Stillwater National Wildlife Refuge personnel.

The Service's findings are based upon literature review, photographs, individuals familiar with the project and/or area, and field surveys. Water quality data was obtained from the Geological Survey and the Bureau of Reclamation.

Although selected endangered species are discussed, this report is not intended as consultation under the Endangered Species Act.

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DESCRIPTION OF THE PLANNING AREA

The planning area includes the Fallon Indian Reservation and hydrologically connected portions of Stillwater Wildlife Management Area, the lower Truckee River, and Pyramid Lake.

The project area encompasses the 8,120-acre Fallon Paiute-Shoshone Reservation of Churchill County located in west-central Nevada. The Reservation is part of the Bureau of Reclamation's Newlands Irrigation Project which provides water from the Truckee and Carson Rivers for irrigation in the Lahontan Valley -- primarily the Carson River basin near Fallon, Nevada. The Reservation is approximately 7 miles northeast of the town of Fallon and 70 miles east of Reno (Figure 1). The Reservation lies southwest of the Stillwater Marshes in the Lahontan Valley which is bounded by the Stillwater Range to the east and the West Humboldt and Humboldt Ranges to the north. Lahontan Valley is an interior terminal basin fed by the Carson River from the west with its headwaters in the Sierra Nevada Range in California, and the Humboldt River from the east with its origins in extreme eastern Nevada. In addition some Truckee River water is diverted into the area via the Truckee-Carson Irrigation Canal. The Carson River is intercepted by Lahontan Dam and Reservoir which releases water for irrigation. The irrigation drain water then flows into Carson Sink and the Stillwater Marshes about 5 miles north of the Reservation. The Humboldt River normally terminates at the Humboldt Sink approximately 30 miles north of the Reservation but in high runoff years it overflows into the Carson Sink to the south. The Reservation is nearly flat with an elevation of about 3,910 feet with drainage to the northeast. Soils within the project area are typically fine grained sands, silts, and clays deposited in complex interbedded, lensing, and gradational relationships. Eolian sands are commonly found as minor dune deposits scattered throughout the area (BIA 1984). Due to the high evaporation rate of this basin, surface soils often exhibit high concentrations of salts. The ground-water table is high, averaging 5 feet or less on the Reservation, and is maintained in part by irrigation of the region.

The Reservation is comprised of two contiguous areas; the first area, totaling 4,640 acres and termed Fallon I, is the original Fallon Indian Reservation established in 1906. An additional 840 acres were added to Fallon I in 1917. In 1977 another 2,640 acres north of Fallon I were transferred from Stillwater Wildlife Management Area (Stillwater) to the Fallon Indian Reservation (BIA 1984). This area is termed Fallon II (Figure 2). The United States Congress added Fallon II to the Reservation to accommodate individuals who received poor soils on the original Reservation.

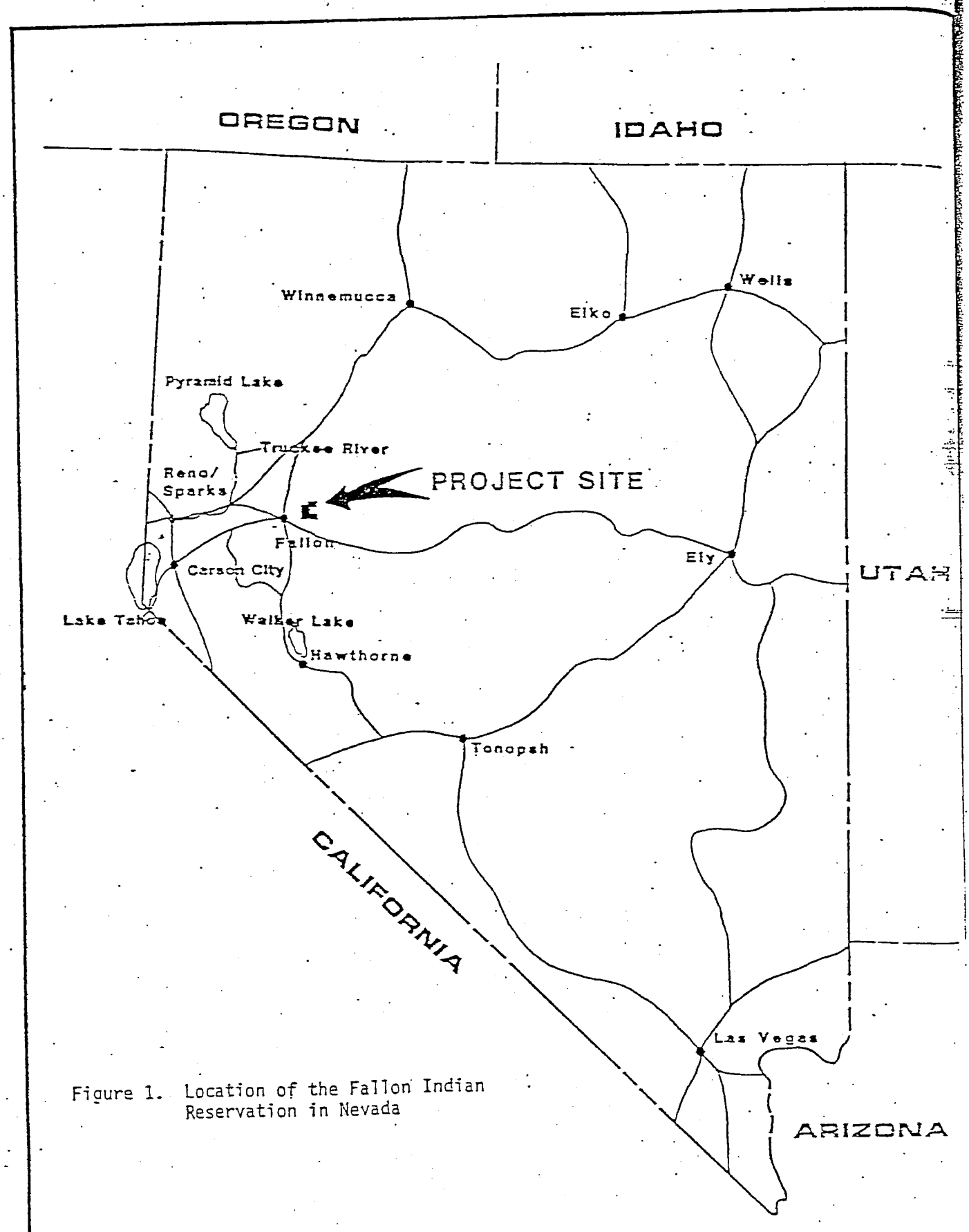

Figure 1. Location of the Fallon Indian Reservation in Nevada

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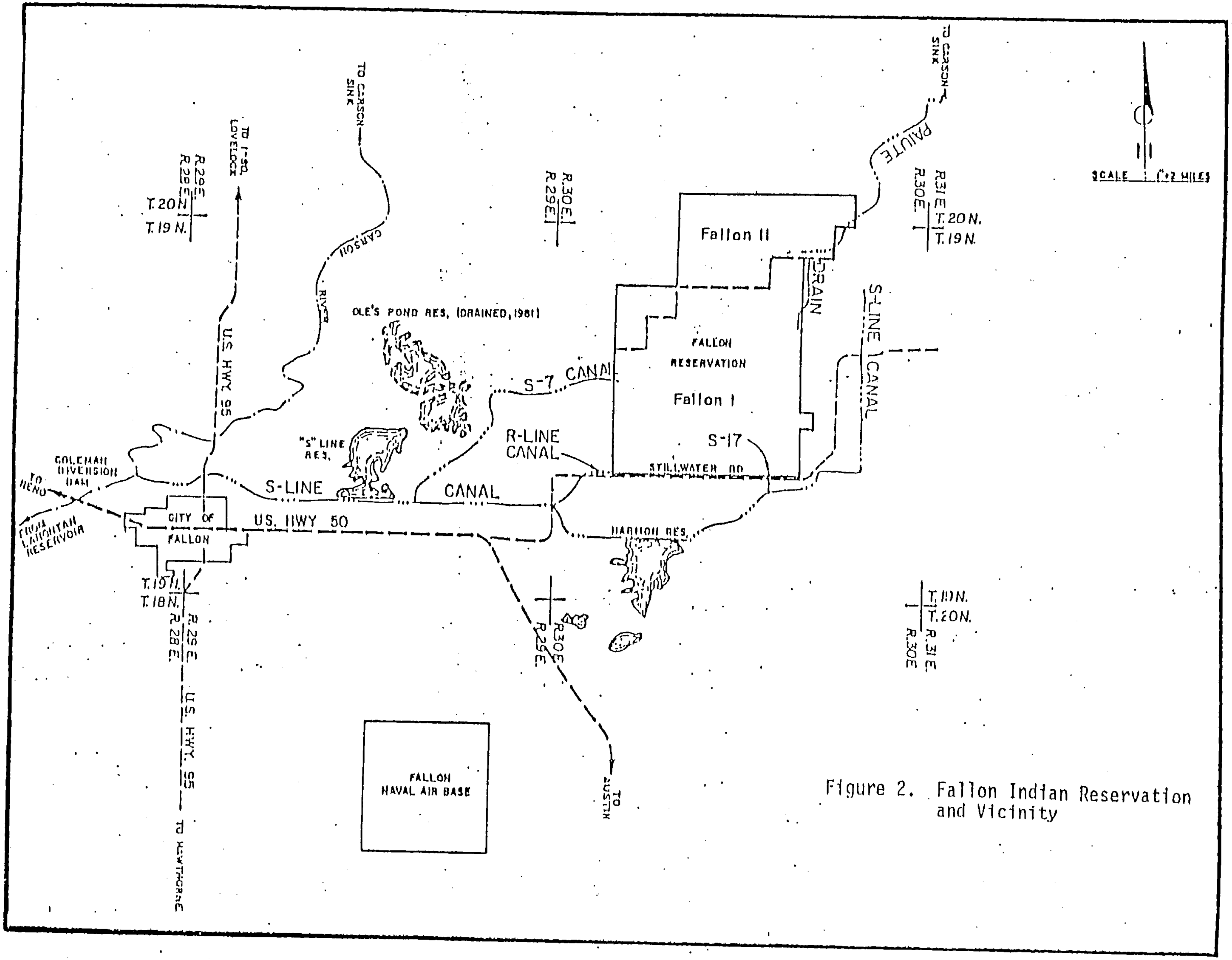

Figure 2. Fallon Indian Reservation and Vicinity

DESCRIPTION OF THE PROJECT

Analysis of the proposed project was conducted using illustrations and information received from the Bureau of Reclamation prior to August 1987. The period of analysis is 50 years (1987-2037).

The Fallon Indian Reservation Irrigation Project is being redesigned by the Bureau of Reclamation for the Bureau of Indian Affairs. The purpose is to develop additional areas into irrigated agriculture, and to upgrade and extend the existing irrigation delivery and distribution system. The irrigation system will be of modern design and will include laser leveling of cultivated lands, and more efficient delivery and drainage systems.

The Reservation has a water entitlement of 19,040 acre-feet annually and 5,440.3 water-righted acres. Approximately 2,230 acres are presently being irrigated (personal communication, Joel Verner, Bureau of Reclamation, Sacramento, California). The Bureau of Reclamation is evaluating the potential of developing the balance of these lands on Fallon II for agriculture with the possible maintenance of existing wetlands and irrigated pasture.

The alternatives outlined by the Bureau of Reclamation are as follows:

1. No Action

2. Open Canal, Closed Drain - Proposed Action
   a. unlined canals
   b. concrete lined canals

3. Open Canal, Open Drain - Construction
   a. unlined canals
   b. concrete lined canals

4. Low- or High-Pressure Pipe, Closed Drain - Construction

5. Low- or High-Pressure Pipe, Open Drain - Construction

6. Land Acquisition Alternative

1. No Action Alternative

Under the no action alternative irrigation practices will remain similar to the present. Currently, restrictive Operating Criteria and Procedures (Operating Criteria) are in place for the entire Newlands Project including the Fallon Indian Reservation. These consist of criteria to determine the amount and timing of diversions for Newlands Project water use and procedures to

assure the criteria are met. Enforcement of maximum water duties as delineated by the Orr Ditch and Alpine water decrees are included in the Operating Criteria. Diversion criteria E as defined in the Draft Environmental Impact Statement for Operating Criteria and Procedures (May 1986) and an allowable diversion of 362,000 acre-feet annually are in place under the No Action alternative. These Operating Procedures will be referred to in this report as E362. In 1988 and thereafter, an even more restrictive set of Operating Criteria are anticipated.

Fields are irrigated by flood irrigation with the water delivered through unlined canals and ditches to farm headgates. No new construction or improvements to the existing irrigation or drainage systems would occur.

Presently (1987), about 2,230 acres of land on the Reservation are under cultivation (personal communication, Joel Verner, Bureau of Reclamation, Sacramento, California). Cultivated land, all occurring on Fallon I, is divided into 10-acre plots and is interspersed with undeveloped and abandoned lands.

Areas in Fallon II have been partially developed with rudimentary water distribution systems and water control structures for pasture and wetland management.

It is assumed that wetland conditions on the Reservation under Future Without the Project (50 year period) will remain similar to present conditions. These wetlands have been utilized for grazing and recreation. The Fallon Paiute-Shoshone Tribe has expressed an interest in maintaining these wetlands through a change in the beneficial use of existing agricultural water rights on the Reservation (personal communication, Jim Bentley, Fallon Paiute-Shoshone Tribe, Fallon, Nevada). For the purpose of analysis we will assume that water rights from a sufficient number of acres will be transfered to maintain the majority of the existing wetlands. Five acre-feet of water is required to maintain one acre of wetland according to the Department of Agriculture lysimeter studies (Norm Saake, Nevada Department of Wildlife, Fallon, Nevada). The transfer of beneficial use of water rights may be challenged in court. The state water engineer would have to approve the transfers.

In the short term some of the wetlands may become desiccated due to Operating Criteria but would become reestablished with water rights.

The existing A, TJ, and TJ-1 drains excavated in anticipation of cultivated agriculture on Fallon II would serve no useful purpose under the No Action alternative.

2. a. Open lined canals, closed drains (Proposed Action)

The proposed action is for trapezoidal shaped open concrete-lined irrigation canals and a closed drain system. Fields would be irrigated by flood irrigation. Existing earthen canals in Fallon

I would be concrete lined and closed drain pipes would be placed in existing open drains and backfilled. The existing TJ and TJ-1 drains would remain open and serve as the terminal drain system for the Reservation.

A water entitlement of 15,400 acre-feet would be allocated for 4,400 acres of agricultural production and irrigated pasture. The remaining 3,640 acre-feet of the water entitlement would be reserved for wetlands on the Reservation provided a water rights transfer is approved. Approximately 193 acres of irrigated pasture would border the wetlands. This pasture would also require a transfer of water rights. The type of transfer proposed for the pasture would be from current uses such as roads, buildings, parking lots, etc.. Similar transfers have been approved by the State Engineer for other lands within the Newlands Project. However, this type of transfer is presently in the U.S. Court of Appeals, Ninth Circuit.

b. Open unlined canals, closed drains (Construction)

The irrigation system layout for this alternative is the same as the proposed action but the canals would be earthen instead of concrete. The water entitlement of 19,040 acre-feet would be applied to agricultural crops only.

3. Open Canals, Open Drains (Construction)

This alternative would be similar to the existing irrigation system on the Reservation. The open canals would be either earthen or concrete lined. Some of the existing drains would be used; however, repair work, maintenance, and deepening of some of these drains would be required.

The water entitlement of 19,040 acre-feet would be applied to agricultural crops only.

4. Low- or High-Pressure Irrigation Pipe, Closed Drains (Construction)

This alternative is considered more modern and efficient than the Proposed Action. The high-pressure pipe distribution system would probably be connected to a sprinkler system. The pipes would be buried with approximately 5 feet of backfill.

Closed drains or pipe drains would consist of buried clay or concrete pipe with openings through which water could enter. Drain water would be carried entirely within the pipe to the point of disposal. Depth of closed drains would be 8 feet for collector pipes and 14 feet for conveyance pipes.

The water entitlement of 19,040 acre-feet would be applied to agricultural crops only.

5. Low- or High-Pressure Irrigation Pipe System, Open Drains

This alternative is a combination of the low- or high pressure irrigation pipe delivery system described under item 4, and the open drain system described under item 3, above.

The water entitlement of 19,040 acre-feet would be applied to agricultural crops only.

6. Land Acquisition Alternative

This alternative, recommended by our agency, would include the purchase and transfer of approximately 2,170 acres of existing irrigated lands to the Fallon Indian Reservation. These lands would be acquired as available throughout the Lahontan Valley although land in the vicinity of the Reservation is most favorably priced in the $1,200.00 to $1,500.00 per acre range. Conflicts with wetland water quality and water quantities in the Truckee River system would be avoided. In addition, efficiency measures outlined as part of the construction alternative could be applied to these acquired lands and the existing 2,230 acres of cultivated lands in Fallon I.

A portion of the Reservation's water entitlement would be reserved to maintain about 728 acres of wetlands on the Reservation if a water rights transfer is approved.

BIOLOGICAL AND SOCIO-ECONOMIC EVALUATIONS

Aquatic and terrestrial resources, with and without the project, are described for the entire planning area. Emphasis is placed upon wetland habitat and open water areas.

A listing of the species and groups of flora and fauna present in the study area is in the Appendix of this report. Because the relative abundance of species or groups of species is generally unavailable for the wetland habitat types involved in the proposed project, we will confine our discussion to wetland acreages. Our analysis of terrestrial resources is confined to a survey of wetland wildlife habitats likely to be impacted by the project.

I. FUTURE WITHOUT THE PROJECT

Aquatic Resources

Fish species occupying the open water habitat within Stillwater are assumed to be representative of species also occurring on the major wetlands on Fallon II. Game species include black bullhead (Ictalurus melas), brown bullhead (Ictalurus nebulosus), yellow

perch (Perca flavescens), Sacramento perch (Archoplites interruptus), white catfish (Ictalurus catus), largemouth bass (Micropterus salmoides), and carp (Cyprinus carpio). Nongame species include Lahontan tui chub (Siphateles bicolor obesus), redside shiners (Richardsonius balteatus), and mosquitofish (Gambusia affinis) (La Rivers 1962). Throughout the Fallon Indian Reservation, it is assumed all of the above species occur, however, numbers are insufficient to support an identifiable fishery. Lead Lake, within Stillwater, is the first in a series of ponds receiving irrigation drain water from the Reservation. Lead Lake supports all of the above listed species. Currently Lead Lake supports a sport fishery comprised primarily of channel catfish, black and brown bullheads.

The aquatic environment is rich in plankton during the warmer months. Insects and other aquatic invertebrates are also a dominant part of the fauna and provide food for fish, shorebirds, and waterfowl.

Terrestrial Resources

The vegetative types represented on the Fallon Indian Reservation include desert, cultivated, and wetlands. The most important of these, from a wildlife perspective, are the wetlands. Several hundred acres of wetlands occupy portions of the Fallon Indian Reservation. Due to the close proximity of these wetlands to Stillwater, they can be considered as one contiguous wetland in terms of their value to migratory birds. These wetlands are essential for migratory waterfowl on the Pacific Flyway because they provide islands of habitat among great expanses of arid land. The Lahontan Valley wetlands support 75 percent of the State's waterfowl-use days, 50 percent of the State's Canada goose population, and 65 percent of the State's whistling swan population (Nevada Department of Wildlife 1984). Because of the special importance of this habitat to wildlife, emphasis was placed upon determining the total area represented by this vegetative community within the Reservation.

The impact upon wildlife resources by the proposed project would result from the change in quality and area of the wetlands. The discussions will focus on wetland vegetation within the Reservation and the adjacent Stillwater Wildlife Management Area.

Quality and quantity of wetlands in 1980 are exemplary of pre-project conditions within the Reservation. In 1982-1983 the A and TJ-1 drains were constructed. These drains created a physical barrier between some of the wetlands and their water source, resulting in desiccation of some wetlands north of the drain. In the spring and fall of 1986 we observed that the dewatered areas had been partially rewatered, but only a few wetland plants had become reestablished. In the summer of 1987 the open water areas had an abundant growth of submergent vegetation.

Acreage and diversity of the vegetative communities classified as wetlands was obtained through several field surveys during August, September, and October 1985 and 1986, and July 1987, aerial photographs, and plant lists compiled for the adjacent Stillwater Wildlife Management Area.

Quantification of vegetation type and abundance was determined from National Wetland Inventory maps developed from 1980 aerial photographs, 1980 Soil Conservation Service infrared photos, and SEA Incorporated's October 1980 topographic orthophotos.

Actual acreages were determined using the SEA topographic orthophotos. Each photo covers a 1/4 section, 160 acres. From these photos acetate overlays were made. The outline of each wetland vegetative type was traced from the photos onto the acetate sheets. The interpretation of vegetative signatures on these photos was varified through field surveys and comparison with infrared photos and National Wetland Inventory maps.

The acreage of desert was determined by subtracting the area of land represented by wetlands, roads, canals, cultivated and residential areas from the total area of the Fallon Indian Reservation.

The area of roads in Fallon I was determined by measuring the perimeter of a 1/4 section and multiplying by an average width of 20 feet to determine the percentage area for a 1/4 section. This percentage was then applied to the area of Fallon I to come up with the total acres of roads.

The length of canals and drains in Fallon I was estimated by measuring a representative section from an aerial photograph with a scale of 400 feet/inch. An average width of 20 feet was assumed. The number of acres was then determined and a percentage obtained for that section. This percentage was then applied to the total area of Fallon I.

An estimate of the length of both roads and canals in Fallon II was determined by measuring the roads and canals known to exist. This was determined from maps and field surveys of the area. An average width of 20 feet was assumed.

Vegetative Community Classification

The vegetative types are categorized according to the National Wetland Inventory Classification System (Cowardin, et al. 1979). The vegetation types present in the study area are palustrine emergent wetland which includes open water, palustrine scrub/shrub broad-leaved deciduous wetland, palustrine forested broad-leaved deciduous wetland, and desert. Palustrine emergent wetlands are defined as nontidal wetlands characterized by erect, rooted, herbaceous hydrophytes. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants. We divided acreages of vegetation under this classification into categories according to

quality: (1) prime, (2) good, and (3) poor. The vegetation present in the "prime" category consists mostly of cattail and bulrush . Baltic rush and spike-rush dominate the areas classified as "good." The areas identified as "poor" consist of drier, less robust stands of baltic and spike-rushes, saltgrass and scattered salt cedar. The open water within the palustrine emergent wetland consists of both open water free of large amounts of vegetation and areas of open water classified as aquatic bed. The aquatic bed class includes wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Dominant plants for this class in the study area include Bacopa, American pondweed, western pondweed, arrowhead, water fern, and duckweed.

The palustrine scrub/shrub broad-leaved deciduous wetland class includes areas dominated by woody vegetation less than 6 meters (20 feet) tall. The shrubs and young trees dominant in the study area include salt cedar and willow.

The palustrine forested broad-leaved deciduous wetland class is characterized by woody vegetation that is at least 6 meters tall. These systems normally possess an overstory of trees, an understory of young trees or shrubs, and a herbaceous layer. In the study area this vegetative community is dominated by cottonwood trees and Russian olive.

The desert community in the study area is dominated by greasewood, saltbush, rabbitbrush, and sagebrush. A complete list of plants found in the area is presented in the Appendix. This list represents species occurring in the adjacent Stillwater Wildlife Management Area. Since Stillwater is adjacent to the Reservation, this list of plants is considered to be representative of uncultivated plants in the project area. Plant collections were made of the dominant varieties for each vegetative community in the study area. These species are marked by an asterisk in the list.

Vegetative Community Distribution

The palustrine emergent wetland community is represented in the greatest abundance in the Fallon II portion of the Reservation (Figure 3). The most extensive wetland areas consisting of open water and "prime" stands of cattail and bulrush are located in T.19 N., R.30 E., sec. 3 (Photo Nos. 1, 2, 3, and 4, see appendix). Other smaller areas of open water and "prime" emergents occur in low spots, drainage areas, and as fringe areas along the edges of fields. Areas such as these are located in the southeast quarter of section 9; the northwest quarter of section 10; and throughout most of section 4, T.19 N., R.30 E. Prime emergents along canals are located throughout the study area. The largest area of palustrine emergent wetlands categorized as "good" are located in Fallon II in sections 2, 3,

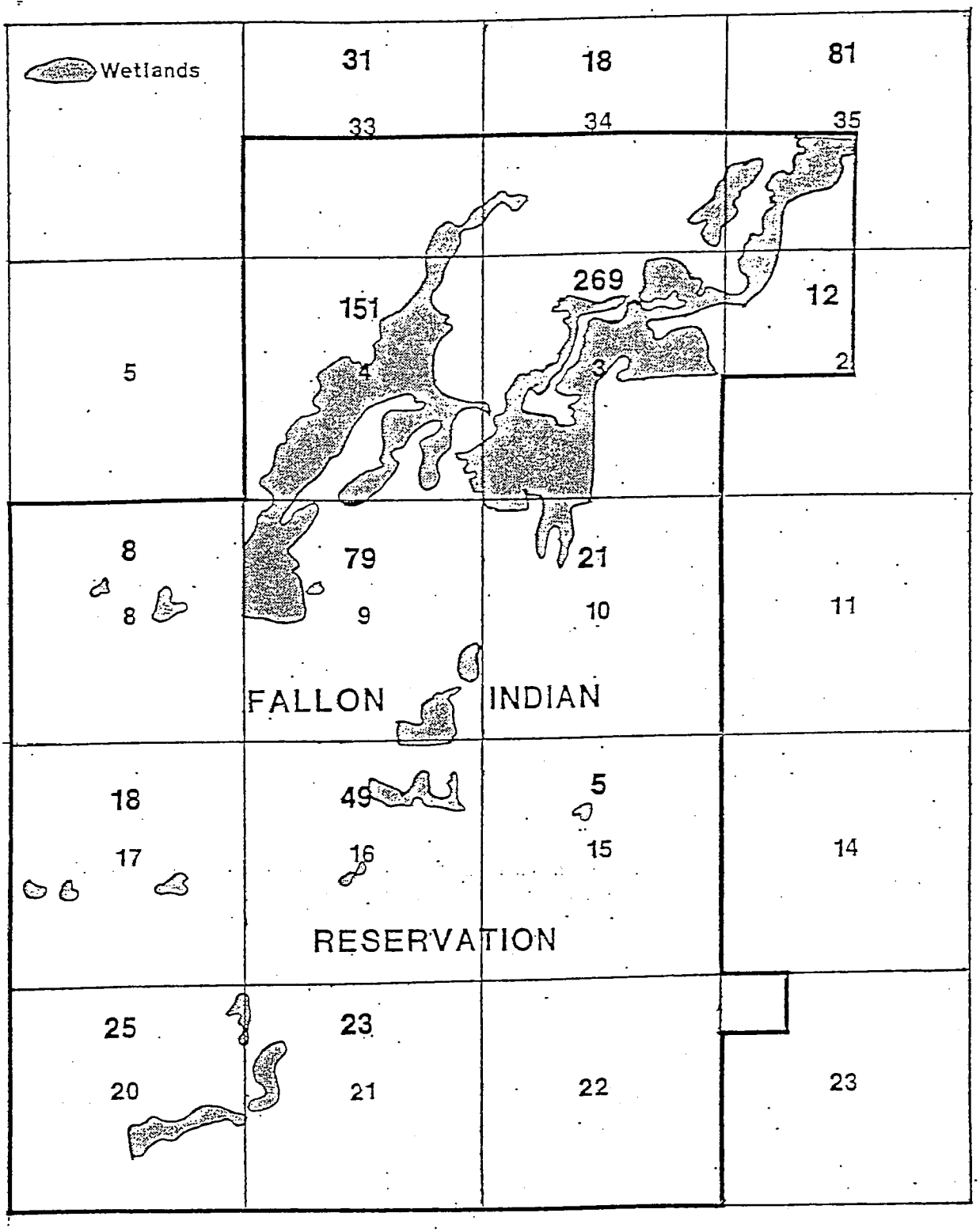

Figure 3. Approximate locations of the major wetland areas on the Fallon Indian Reservation. Acres of wetlands for each section are in bold type above the section numbers.

4, 34, and 35 (Photo No. 5). Smaller areas of this vegetation type are scattered throughout Fallon I in sections 8, 9, 10, 15, 16, 17, 20, and 21. Palustrine emergent wetlands categorized as "poor" are located in sections 4, 8, 17, 33, and 34.

A series of low levees were noted (T.19 N., R.30 E., sec. 4) during field surveys of the Fallon II area, in portions classified as palustrine emergent wetland of "good" and "poor" quality. It appeared that these structures were constructed to form ponds. It was apparent that some areas which were dry at the time of the 1985 survey had been previously flooded; some areas were totally barren and cracked while others had dead cattail stubble and stands of baltic rush (Photo No. 6). We noted that most of these areas were again flooded in the fall of 1986 and during the irrigation season in 1987 (Photo No. 7). Most of these areas were also grazed rather heavily earlier in 1985. Without grazing a greater portion of these wetlands would be classified as good.

Palustrine scrub/shrub broad-leaved deciduous wetland is represented mainly in sections 15, 16, 17, 21, and 35. Areas of less than an acre each are scattered throughout the Reservation. The greatest area of palustrine forested wetland is represented in sections 9, 16, 20, and 21.

Extent of Vegetative Communities

The total acreage for all vegetative communities, and the number of acres of each wetland vegetative community, by section, is presented in Table 1. These acreages represent 1980 data prior to project construction. The acreages for desert, cultivated, roads, residential areas, and canals were not determined for each section.

The most abundant vegetative community is the desert type and comprises approximately 4,626 acres. Cultivated land, the second most abundant type, totals 2,230 acres. The palustrine emergent wetland community comprises a total of 682.5 acres of which there were (as of 1980) 19.3 acres of "prime" stands of bulrush and cattail, 67.0 acres of open water, 547.7 acres of "good" wetlands, and 48.5 acres of "poor" wetlands. The actual acreage of "prime" emergents may be greater. This vegetation was difficult to differentiate from the "good" wetlands on the aerial orthophotos. Palustrine scrub/shrub and forested wetlands comprise 87.9, and 20.7 acres, respectively. Roads, residential areas, and canals comprise approximately 473 acres.

The acreage of wetlands on Fallon I and II totaled 220.9 and 570.2 acres, respectively, for a total of 791.1 acres. Our acreage determination for Fallon II differs from the estimate made by the Fallon Paiute-Shoshone Tribe, Fallon, Nevada. Their estimate of 739 acres included a portion of Fallon I in T. 19 N., R. 30 E., section 9 and was determined utilizing a small scale U.S. Fish and Wildlife Service National Wetland Inventory map. The Tribe indicated that their estimate may be high. Because of

Table 1. Acres of each vegetative community listed by section, and totals for the Fallon Indian Reservation.

Section No.	ACRES								
		PALUSTRINE EMERGENT			SCRUB/ SHRUB	FORESTED	*DESERT	*CULTIVATED	*ROADS, CANALS RESIDENTIAL
	Prime	Good	Poor	Open Water					
					FALLON I				
9	0	61.3	0	5.2	2.7	9.8	-	-	-
10	1.1	17.0	0	.9	.9	.9	-	-	-
15	0	2.2	0	.6	2.5	0	-	-	-
16	0	25.5	0	1.3	18.6	3.7	-	-	-
17	0	7.2	3.3	0	7.8	.1	-	-	-
20	0	22.3	0	0	0	2.6	-	-	-
21	0	16.1	0	0	3.7	3.6	-	-	-
22	0	0	0	0	0	0	-	-	-
23	0	0	0	0	0	0	-	-	-
Total	1.1	151.6	3.3	8.0	36.2	20.7			
					FALLON II				
2	0	12.2	0	0	0	0	-	-	-
3	16.4	223.4	0	28.5	1.1	0	-	-	-
4	1.8	110.1	10.6	28.4	.2	0	-	-	-
8	0	3.8	3.1	.8	.3	0	-	-	-
33	0	0	30.2	.3	0	0	-	-	-
34	0	15.6	1.3	.9	0	0	-	-	-
35	0	31.0	0	.1	50.1	0	-	-	-
Sub Total	18.2	396.1	45.2	59.0	51.7	0			
TOTAL		682.5			87.9	20.7	4,626	2,230	473

*Acres were not determined for each section.

the methodologies used, we consider the Service estimate to be more accurate.

Wildlife

The Fallon Indian Reservation contains wetland areas valuable to waterfowl and water-dependent migratory birds. As discussed above under Vegetative Communities, a major palustrine emergent wetland community consisting of open water and stands of cattail and bulrush is located in the Fallon II area of the Reservation. Prior to 1977 this wetland was part of Stillwater. As previously stated, Stillwater is one of the largest and most important wetlands in Nevada as it provides feeding and resting habitat for thousands of geese, ducks, and other water birds migrating along the Pacific Flyway. Due to its close proximity to wetlands on the Reservation, many of the birds migrating along the Pacific Flyway are assumed to utilize wetlands in the proposed project area. In good water years Stillwater supports peak numbers of 250,000 ducks, 6,000 geese, and 8,000 tundra swans. When nesting conditions are at their best, waterfowl produce up to 15,000 young in a summer. Cinnamon teal, redheads, and gadwalls are the most common nesting ducks, along with lesser numbers of mallards, pintails, ruddy ducks, and shovelers . A variety of shorebirds including avocets, black-necked stilts, snowy plover, Wilson's phalaropes, and long-billed curlews nest in Stillwater and are abundant from early spring through late fall. White-faced ibis, great blue herons, western grebes, snowy egrets, and black crowned night herons are also common in the spring through fall. The most common raptors are the red-tailed hawk, northern harrier, and American kestrel. Hundreds of white pelicans utilize the open water areas for feeding as observed in the open water area in T. 19 N., R. 30 E., section 3 in September 1985. For a complete list of birds occuring at Stillwater (considered representative of species on the Reservation) see the Appendix.

Mammals most common in the wetland areas include the muskrat and mountain vole, and on occasion mink and racoon are known to occur. Blacktail jackrabbit and whitetail antelope squirrel are common in the desert habitat and occasionally coyotes and badgers are seen. The little pocket mouse, pale kangaroo mouse, and northern grasshopper mouse are common in the sandy areas. Also common to the desert in the Indian Lakes area, which is 1 to 2 miles northest of the Reservation, are Merriam's, ord, great basin, and desert kangaroo rats. The valley pocket gopher, spotted skunk, and striped skunk are common in the pastures and farmland. A list of mammals is included in the Appendix.

Sensitive Wildlife Species

Several bird species observed in the wetlands on the Reservation are of special concern. These include the white pelican, white-faced ibis, snowy plover, Swainson's hawk, and loggerhead shrike. Although not federally listed as threatened or endangered, these species are of special concern to both the Service and the Nevada Department of Wildlife. Because of population declines and/or

habitat loss, they may be listed as threatened or endangered in the future. The sharp-shinned hawk, Cooper's hawk, red-tailed hawk, Swainson's hawk, rough-legged hawk, northern harrier, ferruginous hawk, golden eagle, bald eagle, prairie falcon, and American kestrel have been observed in Stillwater. They are protected by Nevada Administration Code 503.050. The bald eagle is listed on the Fish and Wildlife Service's endangered species list. Known bald eagle winter roosting sites occur in cottonwood trees on the Stillwater. It is possible that bald eagles also use cottonwood trees on the Reservation.

Wetland Conditions

Wetland conditions in areas unaffected by unauthorized pre-project construction (A, TJ, and TJ-1 drains) are expected to remain similar to 1980 baseline conditions, which are similar to present conditions. However, wetlands may be temporarily degraded depending upon the management strategy and enforcement of Operating Criteria. If the transfer of the beneficial use of water rights is approved, the condition and quantity of wetlands will be similar to present conditions. Under present conditions approximately 10 percent of the project area not presently developed for agriculture consists of wetlands and open water. The remainder of land is of upland habitat type. The acreage of wetlands fluctuates depending upon the availability of water. Under historic conditions the availability of water was greater than is expected to occur with the enforcement of Operating Criteria.

For the basis of comparison to Future With the Project conditions it is assumed that Operating Criteria will be in place for the 50 year period of analysis of the project, as well as under Future Without the Project. Acreages on Fallon I and II under the No Action alternative are estimated to be approximately 186 and 570 acres, respectively. The majority of the 570 acres of wetlands on Fallon II presently occur. The full 570 acres existed prior to construction of the TJ drain system. It is assumed that water rights transfers will be accomplished to maintain 570 acres of wetlands. Fallon I wetland acres were estimated utilizing the difference in Reservation distribution efficiency between conditions without E362 (pre-Operating Criteria) and conditions with E362 (No Action), and applying the change in runoff to determine the proportional decrease in wetlands. It should, however, be noted that diversion criteria only affect wetlands in very dry or very wet years. In 1987, wetlands were mostly affected by the degree of enforcement of the maximum water duties allocated by the Orr Ditch and Alpine decrees.

Some wetland habitat on Stillwater has been dependent upon water deliveries in excess of those required solely for crops. According to the Truckee-Carson Irrigation District (District) records, discharges into the TJ and Paiute drains from the Reservation averaged 7,627 and 10,164 acre-feet for 1985 and 1986, respectively. These figures exclude an estimated 25 percent contributed to the Paiute drain from non-Indian lands

(personal communication, Willis Hyde, Truckee-Carson Irrigation District, Fallon, Nevada). The average farm headgate delivery for these years was 9,206 acre-feet. In the Lahontan Valley, typically 65 percent of the water delivered to farm headgates is consumed by crops (State of Nevada and UNR 1974). The remainder should enter the drains. Thus, an average of only 3,222 acre-feet of drain water should have entered the TJ and Paiute drains.

It is known that a sufficient supply of water must be delivered to the Reservation boundary to meet the irrigation requirements and to account for delivery losses between the boundary and the farm headgates. The distribution efficiency on the Reservation for 1980-1986 is estimated to be 48 percent. Gross water deliveries to the Reservation between 1980 and 1986 averaged 16,250 acre-feet (personal communication, Willis Hyde, Truckee-Carson Irrigation District, Fallon, Nevada). Poor efficiencies combined with the above drain data for 1985 and 1986 implicate that a large portion of the excess water delivered to the Reservation drains into Stillwater and maintains some of its wetlands. Under historic conditions (prior to Operating Criteria) it is estimated that about 1,779 acres of wetlands were supported on Stillwater with Reservation water.

Under future without the project conditions, with Operating Criteria, it is estimated that drain water reaching Stillwater would support about 546 acres of wetlands. This is the estimated acreage that would be supported by drain water from Fallon I only.

Public Use

Public use activities on Stillwater include waterfowl hunting, fishing, wildlife observation, camping, picnicing, trapping, and photography. The total activity time for 1984, 1985, and 1987 averaged 192,410 hours (personal communication, Ken Merritt, Stillwater Wildlife Management Area, Fallon, Nevada). Using these years as a baseline and assuming public use is proportional to the area of wetlands, the activity hours would decrease by about 9 percent to 175,478 hours due to the enforcement of Operating Criteria upon the amount of drain water entering Stillwater from the Reservation only. This estimate does not include potential losses caused by decreases in drain water entering Stillwater from other lands in the Newlands Project due to Operating Criteria. This is an estimate and may vary depending upon the ratio of open water to wetland vegetation, and the depth and water quality of open water areas.

On the Reservation, recreational use is expected to remain similar to the present assuming that water rights transfers are approved to maintain existing wetlands.

II. FUTURE WITH THE PROJECT

General analyses are based upon information obtained from the July 1986 Master Plan for Development map provided by the Bureau of Reclamation, maps by the Laboratory of Native Development Systems Analysis and Applied Technology of the University of Arizona (Norvelle, et al. 1979), SEA Incorporated, and the proposed draft Environmental Impact Statement for the project.

Future With the Project conditions are evaluated based upon Future Without the Project conditions. Historic conditions, prior to the enforcement of Operating Criteria, are discussed for comparison purposes only.

Direct Impacts

In sections 3, 4, 33, 34, and 35, approximately 174 acres of "good" palustrine emergent wetland, 2 acres of "prime" palustrine emergent wetland, 29 acres of open water, 20 acres of "poor" palustrine emergent wetland, and 39 acres of scrub/shrub wetland had been filled or cut off from their water source by construction of the A and TJ-1 drains. Construction of the A and TJ-1 drains took place during 1983 and 1982-1983, respectively. Our field observations in 1986 and 1987 indicate that these Fallon II wetlands are now receiving canal water. Portions of the wetlands desiccated in section 4 have been restored with water from a 30-inch pipe which conveys water from the S-7 lateral. The pipe and delivery system were not part of the proposed project.

Although approximately 264 acres of wetlands were filled or desiccated since 1982, two-thirds (177 acres) of these wetlands present on Fallon II in 1980 were reestablished by 1986 (photograph No. 7 shows a portion of the rewatered wetlands). Most of this area was open water and little emergent vegetation had become reestablished. In 1987 only about 25 percent (66 acres) of the 1980 wetlands that had been lost were present. These wetlands consisted of open water with dense matts of submerged aquatic vegetation, baltic rush, and spike-rush.

With implementation of the project, water may be available to wetlands on the Reservation. Plans for agricultural development in Fallon II (under the Proposed Action alternative) are designed to avoid the majority of the wetlands, however, unless beneficial water rights are obtained for these wetlands, legally there will be no prime water to support them. If only drain water is available to these wetlands, it may not be possible to maintain them because the newly constructed A and TJ-1 drains, which would be the only available water source for these wetlands, are 10 to 15 feet below the ground level. Water would have to be pumped from the drains to supply the wetlands. If drain water were

otherwise available for wetlands, it would be of relatively poor quality. Water quality for wetlands is discussed under the indirect impacts section of this report.

Water rights for the proposed pasture in Fallon II are not yet acquired. The Tribe is planning to transfer water rights from non-agricultural lands on Fallon I to the pastures (personal communication, Jim Bentley, Fallon Paiute-Shoshone Indian Reservation Tribal Headquarters). The legality of this type of transfer is now being decided in the Ninth Circuit Court of Appeals.

If it is assumed that water rights transfers are obtained for wetlands and pasture under the Proposed Action alternative, about 570 acres of wetlands on Fallon II would be preserved. Direct impacts to wetlands on Fallon I will initially occur due to laser leveling and other undefined modernization practices of the existing agricultural areas in the Fallon I portion of the Reservation. Surface runoff presently supports wetlands along the edges of fields, in low areas, and on undeveloped lands. Most of the wetlands initially lost will become reestablished over time. It is estimated that about 28 acres of wetlands will be permanently lost due to the increased efficiency of the irrigation system with the wetlands stabilizing at about 158 acres.

Under the Proposed Action, drain water from Fallon I and II on the Reservation would support about 1,078 acres of wetlands in Stillwater. This is a reduction in the quality and acreage of wetlands supported under Future Without the Project conditions prior to 1987. Compared to Future Without the Project conditions (over the 50 year period of analysis) with enforcement of water duties contained in the Operating Criteria, there is a projected increase of approximately 532 acres of poor quality wetlands under the Proposed Action. These wetlands would be of poor quality because water leaving the Reservation is contaminated (discussed under indirect impacts section). The contaminants would accumulate in the wetlands on Stillwater and pose a hazard to plant and animal life including fish and migratory birds.

Under the Construction alternatives (No.s 3-5) wetlands on Fallon II would be lost. Acreage of wetlands lost on Fallon I due to the increased efficiency of the irrigation systems would be 11, 28, and 54 acres with the earth ditch, lined canal, and pipeline systems, respectively. On Stillwater an increase of about 786 acres of poor quality wetlands (compared to the No Action alternative) is expected to occur.

Under the Land Acquisition alternative, it is estimated that about 28 acres of wetlands will be lost due to the increased efficiency of the irrigation system on Fallon I. The amount of water available to Stillwater would be the same as for future without the project conditions and would support about 546 acres of wetlands. This figure is based on the assumption that about 2,230 acres would remain in production on Fallon I, the water

duty will average 3.5 acre-feet per acre, and that 35 percent of the tailwater from this land will enter the Paiute drain and support wetlands at Stillwater.

Indirect Impacts

Potential indirect impacts with the project vary with alternatives and include: 1) an increase in the load and concentration of total dissolved solids, 2) an increase in levels of contaminants in the water reaching Stillwater, 3) changes in the quality of these wetlands, and 4) a change in withdrawals of water from the Truckee River and Pyramid Lake.

Historically, the entire Carson River was the water source for the Lahontan Valley wetlands. On the average, over 80,000 acres were maintained. This fresh water supply has been replaced largely by agricultural drainage water from irrigated lands in Lahontan Valley, including the Fallon Indian Reservation. In addition to substantial reductions in wetland size, water quality has been reduced with total dissolved solids being concentrated about three to six times over Carson River water. With this concentration of dissolved solids, wetland vegetation has been replaced by species more tolerant of high salt levels and productivity is generally diminished. Dilution occurs during wet cycles when some additional Carson River water is available to wetlands.

Indirect project impacts would put additional stress on the wetlands in Stillwater. The Reservation has been receiving most of its full water right of 19,040 acre-feet annually (Willis Hyde, Truckee-Carson Irrigation District, Fallon, Nevada). Approximately 2,200 acres have been under irrigation on the Reservation, thus the water requirement has been about 7,700 acre-feet. The excess water received by Stillwater has supported wetlands. Because much of this water was in excess of that needed for irrigation and most of the lands in agricultural production have been irrigated for many years, the drain water has been relatively low in total dissolved solids. Bureau of Reclamation water quality data from the new drains (A, TJ-1, and TJ), which run through non-irrigated lands on Fallon II, indicate these soils are laden with contaminants (USBR 1987a).

The area drained from the irrigated lands on the Reservation comprise about 4 percent of the average drainage area of the Newlands Irrigation Project. Waters from the A, TJ-1, and TJ drains enter into Lead Lake of Stillwater (Figure 4).

Evidence of potential contamination problems within the agricultural drain waters in Lahontan Valley has been the basis for three related studies. The U.S. Geological Survey, the Service, and the Nevada Department of Wildlife are conducting contaminant screening studies which include most of the larger wetland units in Lahontan Valley. The Service and Geological Survey studies include the sampling of water, sediments, migratory birds, fish, invertebrates, and plants. The Service is

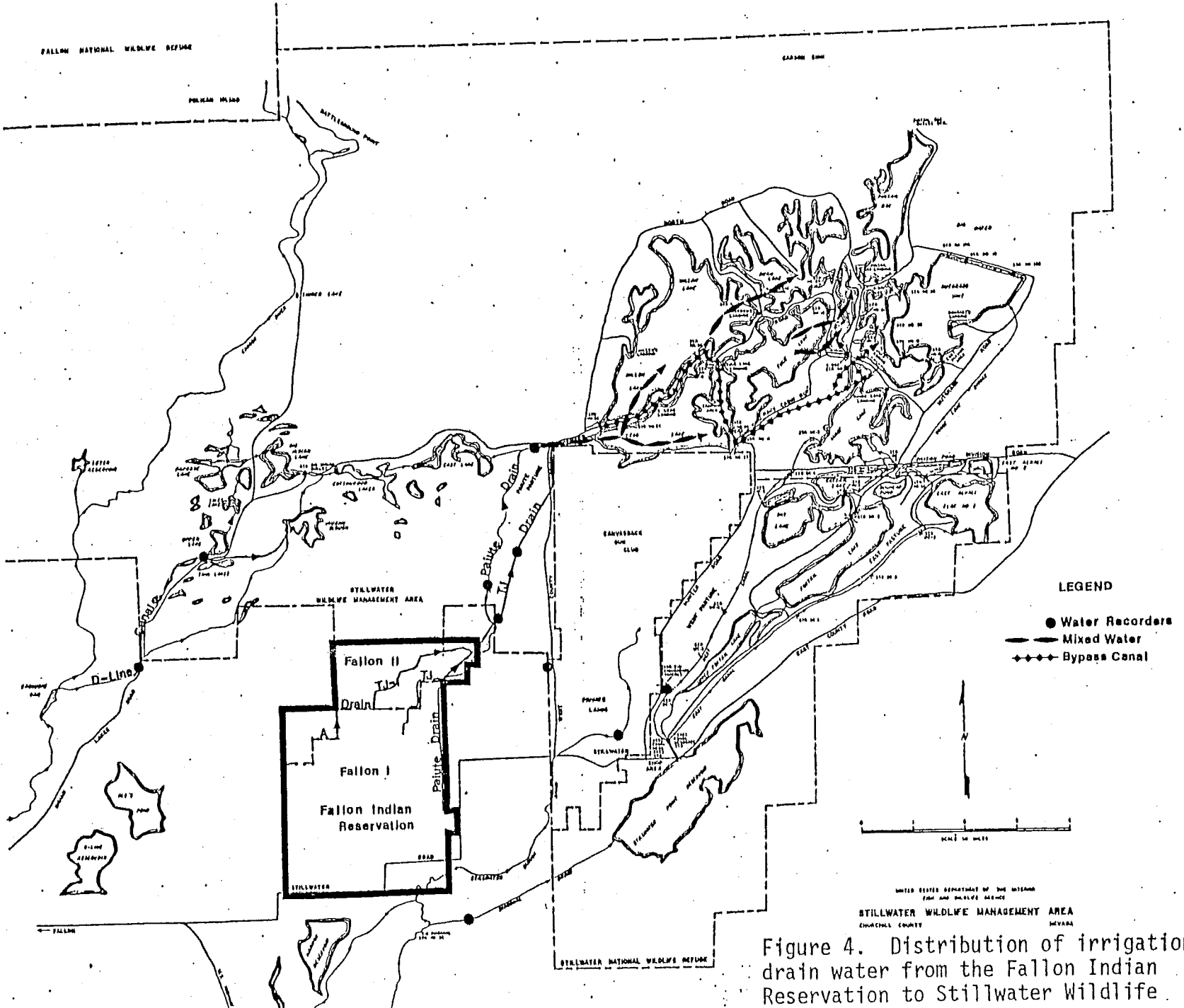

Figure 4. Distribution of irrigation and drain water from the Fallon Indian Reservation to Stillwater Wildlife

also conducting a survey of nesting success which includes analysis of migratory bird eggs. The Bureau of Reclamation sampled surface and ground water throughout the Fallon Indian Reservation for a wide array of contaminants.

Water samples collected from canals and drains during the irrigation season by the Bureau of Reclamation on the Reservation are used for contaminant analysis. Water samples taken during the irrigation season are considered to be the least biased because the water is flowing through the system during this period. Levels of elements are compared for the months of April through September on the Reservation. These months represent the major irrigation period (according to Reservation delivery data obtained from TCID approximately 94 percent is delivered from April through September).

Surface waters leaving the Fallon Indian Reservation through the newly constructed A, TJ-1, and TJ drains have noticeably higher concentrations of arsenic, boron, and total dissolved solids (TDS) than supply waters in the S-7 and R-line canals, and the older Paiute drain (USBR 1987a). Levels of arsenic in the A, TJ-1, and TJ drains averaged 147, 115, and 128 micrograms/liter (ug/l) respectively, over a 6 month period from April through September. Arsenic in the Paiute drain averaged 18 ug/l whereas levels in the S-7 and R-line canals averaged 9 ug/l, and 8.5 ug/l, respectively. Levels of boron averaged 11,750 ug/l, 10,900 ug/l, and 25,500 ug/l, for the A, TJ-1, and TJ drains, respectively versus 620 ug/l for the Paiute drain and <200 ug/l for the S-7 and R-line canals. Levels of selenium in the A, TJ-1, and TJ drains averaged <1 ug/l, 2.5 ug/l, and 20 ug/l respectively. The Paiute drain, S-7, and R-line canals averaged <1 ug/l selenium (USBR 1987a). Levels of selenium $\geq$2 ug/l were considered unacceptable for wildlife by the U.S. Fish and Wildlife Service for the San Luis Refuge. Total dissolved solids averaged 4,857 mg/l, 10,888 mg/l, and 27,585 mg/l for the A, TJ-1, and TJ drains, respectively. The Paiute drain, S-7, and R-line canals averaged 549 mg/l, 177 mg/l, and 175 mg/l, respectively (USBR 1987a) (Table 2).

Preliminary loading estimates by the U.S. Geological Survey indicate high levels of total dissolved solids and boron in drain water leaving the Reservation. The loading estimates are based on instantaneous measurements taken during March 1987 and are adjusted for volume of water. Levels of TDS and boron in the TJ drain were 82,000 lbs/day and 77 lbs/day, both elevated over levels in the Carson River (Table 3). Levels of molybdenum and vanadium in the TJ drain were also elevated over Carson River levels, however, the significance of these to fish and wildlife is not known. Total dissolved solids in the Paiute drain were 21,000 lbs/day compared to 6,600 lbs/day for the entire Carson River below Lahontan Dam.

Results of the Service's preliminary irrigation drainage study have revealed either elevated or effect levels of arsenic, boron,

Table 2. Surface water quality analysis for arsenic, boron, selenium, and total dissolved solids for water entering the Reservation through the S-7 and R-line canals, water leaving via the newly constructed drains, and the older Paiute drain on the Reservation.

	Canals		New Drains			Old Drain
	S-7	R-Line	A	TJ-1	TJ	Paiute
Arsenic (ug/l)	9	8.5	147	115	128	18
Boron (ug/l)	<200	<200	11,750	10,900	25,500	620
Selenium (ug/l)	<1	<1	<1	2.5	20	<1
Total Dissolved Solids (mg/l)	177	175	4,857	10,888	27,585	549

Source: U.S. Bureau of Reclamation. 1987. Fallon Indian Reservation Water Quality Report. U.S. Bureau of Reclamation, Mid-Pacific Region.

Note: All values are an average of monthly samples collected by the Bureau of Reclamation from April through September 1986.

Table 3. Preliminary loading estimates for the Paiute Drain, TJ Drain, and the Carson River during the pre-irrigation season (March) of 1987.

	Carson River below Lahontan Dam	Paiute Drain	TJ Drain
Stream Flow (CFS)	4.5	4.2	0.51
Total dissolved solids (lbs/day)	6,600	21,000	82,000
Arsenic (lbs/day)	1.1	0.5	0.5
Boron (lbs/day)	9.0	4.3	77
Molybdenum (lbs/day)	0.3	0.5	2.4
Selenium (lbs/day)	<.03	<.03	.003
Vanadium (lbs/day)	0.2	<0.6	8.8

Source: U.S. Geological Survey-preliminary data is based upon instantaneous measurements taken during March 1987.

mercury, and selenium in samples of flora and fauna from the TJ drain and Lead Lake (Figure 5).

The "elevated" level is based upon one of three criteria depending upon the amount of data available for each contaminant involved. The three criteria are: (1) The level which represents the 85th percentile of all available data nationwide (National Contaminant Biomonitoring Program), (2) the level obtained from the USFWS Biological Reports 85 (1.5 & 1.10), (3) the level obtained from study data presented by the U.S. Fish and Wildlife Service National Academy of Sciences meeting, winter 1987. The "effect" level is the residue level in liver tissue of waterfowl experiencing reproductive failure. Elevated and/or effect levels were not found in the literature for all of the organisms we sampled. Where the elevated level is not indicated for a particular plant, invertebrate, or bird in Figure 5, it is unknown.

Elevated levels of arsenic, mercury, and selenium were found in mosquitofish and carp collected from the TJ drain. Mercury levels were elevated in dipteran larvae and carp from Lead Lake. Levels of selenium were elevated in algae, dipteran and hemipteran larvae, black-necked stilts and coots from Lead Lake. Composite samples of livers from six juvenile black-necked stilts collected from Lead Lake averaged 18.3 parts per million (ppm) selenium, dry weight. Levels above 10.0 ppm are considered elevated (USFWS National Academy of Sciences meeting, winter 1987). The livers from five coots averaged 7.8 ppm selenium -- 2.8 ppm above the level considered elevated for coots (USFWS National Academy of Sciences meeting, winter 1987). Black-necked stilts from Lead Lake were also found to have high levels of boron. Composite samples of livers from six juvenile birds averaged 60.7 ppm. Levels of 60 ppm in adult mallard liver residue resulted in reproductive failure (effect level)(personal communication, Greg Smith, USFWS Patuxent Wildlife Research Center). Elevated levels of other elements were also found. Chromium levels for carp in Lead Lake averaged 7.1 ppm. Four ppm chromium is considered elevated. Levels of copper in carp and mosquitofish, and levels of zinc in carp were elevated in these fish collected from the TJ drain.

Elevated levels of elements, including those discussed above, accumulate in invertebrates and plant parts utilized by birds and fish as food. The potential impacts to fish and migratory bird species would be possible weakness and susceptibility to disease, poor reproductive success, deformities, and death. Some of these problems are already occuring in the Lead Lake area which receives TJ drain water from the Reservation. The problems are as follows: 1) Three fish kills occured at Lead Lake during 1987; 2) Very few juvenille fish have been observed in the waters, an indication that reproductive success may be poor; 3) There have been continuous bird die-offs in the Lead Lake area with a high ratio of these birds (2:1) being fish eating birds. Some of the deaths were confirmed botulism cases; 4) During a three month period in 1987, 24 dead pelicans were found in the

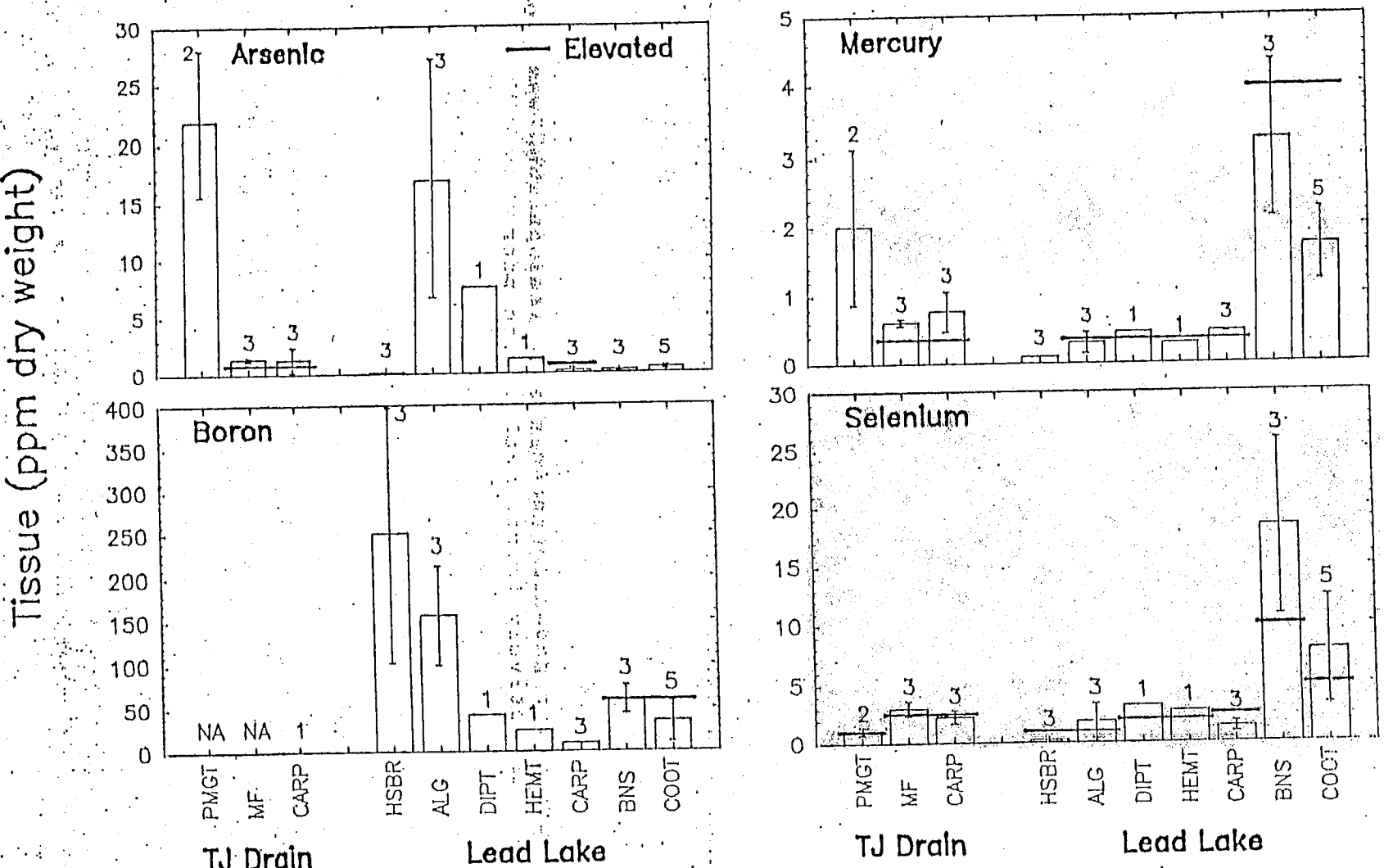

Figure 5. Levels of arsenic, mercury, boron, and selenium in the tissues of potamogeton (PMGT), mosquitofish (MF), carp, hardstem bulrush (HSBR), algae (ALG), dipteran larvae (DIPT), hemipteran larvae (HEMT), black-necked stilts (BNS), and coots collected from the TJ drain on the Fallon Indian Reservation and Lead Lake on the Stillwater Wildlife Management Area. Data given are the mean (bar), range, and sample size (number). The sample size of one for each dipteran and hemipteran larvae sample represent > 1000 individual larvae from one location.

Lahontan Valley. Half of these birds were from Lead Lake. Seventy five percent of the American white pelican use on Stillwater is at Lead Lake (personal communication, Steve Thompson, Stillwater Wildlife Management Area, Fallon, Nevada); 5) During the summer of 1987 two juvenile coots were found with deformed wings.

Up through the 1950s the Lead Lake area supported a major bass fishery in Nevada and the west. In the 1950s the average bass weighed 2 pounds and the largest bass caught was 9 pounds, 5 ounces (USFWS. 1952). According to angler surveys of the West Marsh and Lead Lake areas between 1957 and 1978 the number of bass declined steadily during the 1960s. Between 1974 and 1978 the number of bass in the creel was negligible (personal communication, Mike Sevon, Nevada Department of Wildlife, Fallon, Nevada). Currently the sport fishery is comprised primarily of channel catfish, and black and brown bullheads (personal communication, Jim Curran, Nevada Department of Wildlife, Fallon, Nevada).

Considering the poor quality of water entering Lead Lake, the recent fish kills, and the potential for additional loads of salt and contaminants with implementation of the Proposed Action and Construction alternatives, it is unlikely that the bass fishery would have the potential for reestablishment.

Two studies have been conducted on reproductive success in the North Marsh area of Stillwater which includes Lead Lake. From 1968 through 1970 the average reproductive success for all ducks studied was between 42.5 and 53.5 percent (Napier 1968, 1969, and 1970). Reproductive success was 42.5% in 1968 and 41.7% in 1969 for gadwalls, and 50.0%, 55.8%, and 49% for cimmamon teal in 1968, 1969, and 1970, respectively (Napier 1968, 1969, and 1970). Reproductive success for gadwalls and cinnamon teal in 1983 was 13.0% and 28.0%, respectively (Evans 1983). The poor reproductive success in 1983 could have been due to a number of reasons upon which no conclusions can be drawn without further data. The Service conducted a study on reproductive success of waterfowl and shorebirds within the Lahontan Valley in 1986 and 1987, however, results from this study are not yet ready for release.

Water quality conditions of irrigation drainage under the Proposed Action and Construction alternatives would be degraded over Future Without the Project conditions. Agricultural development of lands on Fallon II would contribute large quantities of contaminants to Stillwater. Water quality conditions with the Land Acquisition alternative would be similar to Future Without the Project conditions.

Other indirect impacts are those anticipated from additional withdrawals of water from the Truckee River and Pyramid Lake. Water deficiencies in the Truckee River system have led to listing of the cui-ui (Chasmistes cujus) and Lahontan cutthroat trout (Salmo clarki henshawi) as endangered and threatened

species, respectively. A breakdown of eligible acres, water duty, efficiencies, target diversions, and Truckee River diversions under the Future Without and Future With the Project conditions, are presented in Table 4. Under Future Without the Project conditions about 2,230 acres of bottom land would receive 3.5 acre-feet per acre and wetlands would receive about 3,780 acre-feet assuming water rights transfers were approved, for a total entitlement of approximately 11,585 acre-feet. The Future Without the Project Reservation distribution efficiency with E362 is estimated to be approximately 60 percent. Thus, the Reservation boundary requirement would be about 19,308 acre-feet annually. With the project, 19,040 acre-feet would be entitled. Under Future With the Project alternatives, excluding the Proposed Action and Land Acquisition alternatives, it is assumed that the full water entitlement would support crop production. With the Proposed Action alternative it is assumed that a portion of the water entitlement would maintain irrigated pasture, agricultural crops, and the majority of the 1980 wetland acreage. With the Land Acquisition alternative these wetlands would also be maintained. The amount of water reserved for wetlands would support approximately 728 acres. Prior to the construction of the A, TJ, and TJ-1 drains, and Operating Criteria, approximately 791 acres of wetlands existed on the Reservation.

Reservation distribution efficiencies would be approximately 65 percent (earth ditches), 75 percent (lined canals and Proposed Action alternative), 98 percent (pipelines), and 75 percent (Land Acquisition). These efficiencies are estimates based upon conversations with Reclamation personnel. Based on these efficiencies the Reservation boundary requirement would be 29,292 acre-feet for earth ditches, 25,387 acre-feet for lined canals and Proposed Action alternative, 19,429 acre-feet for pipelines, and 15,260 acre-feet (requirement for current Reservation lands) for the Land Acquisition alternative.

Annual allowable water diversions anticipated with the earth ditch, lined canal, Proposed Action, pipeline, and Land Acquisition alternatives were calculated after separating the Fallon Indian Reservation entitlement, adjusting the conveyance system efficiencies for the Indian Reservation portion of the Carson Division, and adjusting the target diversions for the bench and bottom lands of the Carson division (to account for the water needed for the Reservation under the given efficiencies). The values under each alternative are presented in Table 4. Truckee River diversions for each alternative were estimated utilizing the total demand (annual allowable diversion) for the Newlands Project water needs, E362 as the Operating Criteria, and Reclamation's Truckee-Carson Hydrologic Model to determine 80-year average annual water diversion figures of 383,712, 378,505, 370,561, and 353,227 acre-feet for the earth ditch, lined canal and Proposed Action, pipeline, and Land Acquisition alternatives, respectively (Table 4). The model is based upon 80 years (1901-1980) of hydrologic data. Two assumptions are used in the design of the model: 1) that the historic hydrologic data series is

Table 4. Truckee River Diversions under Future Without the Project conditions on the Fallon Indian Reservation, and Future With Bureau of Reclamation's proposed alternatives (earth ditch, lined canal, and pipeline irrigation systems) and the land acquisition alternative with 5,440 eligible acres. Projected conditions Without and With the Project are based upon diversion criteria E and an allowable diversion of 362,000 acre-feet annually (OCAP).

	FALLON INDIAN RESERVATION								
	Truckee Division	Carson Division		Future w/o the Project (with OCAP)	Future with the Project (with OCAP)				
	Bench	Bench	Bottom w/o Reservation	No Action	Earth Ditches	Lined Canals	Proposed Action	Pipelines	Land Acquisition
Eligible Acres	4,228[a]	13,068[a]	36,568	2,230/756[b]	5,440	5,440	4,400/728[b]	5,440	2,230/728/ 2,170[c]
Water Duty	4.5	4.5	3.5	3.5/5.0	3.5	3.5	3.5/5.0	3.5	3.5/5.0/3.5
Entitlement	19,026	58,806	127,988	11,585	19,040	19,040	19,040	19,040	19,040
Reservation Distribution Efficiency	-	-	-	60%[d]	65%[e]	75%[e]	75%	98%[e]	75%
Reservation Boundary Requirement	-	-	-	19,308	29,292	25,387	25,387	19,429	15,260
Conveyance System Efficiency	72%[f]	60%[g]	60%[g]	75%[h]	75%[h]	75%[h]	75%[h]	75%[h]	75%
Target Diversion	26,425	95,984[i]	208,904[i]	25,744	39,056	33,849	33,849	25,905	16,971[j]
Annual Farm Diversion Requirement	-	-	-	357,057[k]	378,769[k]	373,562[k]	373,562[k]	365,618[k]	348,284[l]
Annual Allowable Diversion	-	-	-	362,000[m]	383,712[m]	378,505[m]	378,505[m]	370,561[m]	353,227[m]
Truckee River Diversion	-	-	-	148,400[n]	164,400[n]	160,800[n]	160,800[n]	155,100[n]	141,900[n]
Increase Truckee River Diversion with OCAP	-	-	-	-	+16,000	+12,400	+12,400	+ 6,700	- 6,500[o]

For Footnotes see the following page.

Table 4. (continued)

a) These numbers were obtained from the Environmental Assessment for Interim OCAP for the Newlands Project, Water Year 1987.

b) Agriculture/Wetlands - the number of acres of agriculture and wetlands may vary depending upon water rights law.

c) Reservation lands - agriculture 2,230/wetlands 728, non-Reservation lands - agriculture 2,170; the number of acres of agriculture and wetlands may vary depending upon water rights law. The 2,170 acres is currently developed within the Carson Division for agriculture. It is assumed that efficiencies and conditions on this potentially acquired land would be similar to conditions on the Reservation without the project. With the project, efficiencies would equal those for the lined canal and proposed alternatives.

d) Source - U.S. Fish and Wildlife Service estimate - see text for explanation.

e) Source - Joel Verner, Bureau of Reclamation, Sacramento, California, June 1987.

f) Efficiency between Derby Dam and the farm headgates. Source - May 1986 draft EIS for the Newlands Project Proposed Operating Criteria and Procedures.

g) Efficiency between Lahontan Dam and the farm headgates. Source - May 1986 draft EIS for the Newlands Project Proposed Operating Criteria and Procedures.

h) Efficiency between Lahontan Dam and the Reservation boundary. Source - Gene Harms, Bureau of Reclamation, Carson City, Nevada.

i) These figures were lowered proportionally to account for the water needed for the Reservation under the given efficiencies.

j) This is the target diversion for Reservation lands only.

k) The sum of the Truckee Division Bench, Carson Division Bench and Bottom, and the applicable Fallon Indian Reservation alternative.

l) In determining this number the water savings for the 2,170 acres on non-Reservation lands and the 2,230 acres on the Reservation was considered. The savings was determined by taking the difference between target diversions using future without the project efficiencies and those under projected efficiencies. These differences were then lumped into one column.

m) The sum of the domestic water supply, Truckee Division Bench, Carson Division Bench and Bottom, and the applicable Fallon Indian Reservation alternative; these figures are commonly known as the allowable diversions used with the various OCAPs.

n) Source - Truckee-Carson Hydrologic Model - Bureau of Reclamation, Carson City, Nevada; this model adjusts for the efficiencies between Derby Dam and Lahontan Reservoir and for reservoir storage efficiencies.

o) This is a theoretical savings from the Truckee River assuming that the unused balance of the Tribe's water entitlement on the Reservation (7,595 acre-feet) will not be abandoned or utilized.

going to repeat itself, and 2) that all management procedures and demands will remain constant over the 50 year period of the project. For a more detailed explanation of the model refer to the draft Environmental Impact Statement for the Newlands Project Operating Criteria and Procedures (USBR 1986).

Truckee River diversions are estimated to be about 164,400 acre-feet (earth ditch), 160,800 acre-feet (lined canal), 155,100 acre-feet (pipeline), 160,800 (Proposed Action), and 141,900 acre-feet for the Land Acquisition alternative. Truckee River diversions under Future Without the Project conditions are estimated to be about 148,400 acre-feet annually.

Net delivery increases to the Reservation would be between 121 and 9,984 acre-feet annually with the Proposed Action and Construction alternatives. Much of the additional demand would be met from the Truckee River. The Land Acquisition alternative would decrease present deliveries by 4,048 acre-feet annually.

The increased annual demand for Truckee River water under the earth ditch, lined canal and Proposed Action, and pipeline alternatives would be 16,000, 12,400, and 6,700 acre-feet per year, respectively. Under the Land Acquisition alternative there would be a savings of about 6,500 acre-feet annually. This is a theoretical savings assuming that the unused balance of the Tribe's water entitlement on the Reservation (7,595 acre-feet) would not be utilized.

Historically, Truckee River diversions have been higher than diversions estimated for the Future Without the Project with E362. Between 1907 and 1970 about half of the Truckee River was diverted to the Lahontan Valley (Sumner 1940, Sigler et al. 1985). The average Truckee River flow between 1901 and 1980 is estimated to be about 550,000 acre-feet annually (determined using Reclamation's Truckee-Carson Hydrologic Model). Assuming half of this was diverted to the Lahontan Valley, Truckee River diversions averaged about 275,000 acre-feet annually between 1907 and 1970. Although these figures are only estimates, they can be used as a basis for general comparison to more recent diversions. A decrease in Truckee River diversions took place around 1967 according to U.S. Geological Survey measurements. Records between 1967 and 1983 indicate that the annual diversions averaged 194,170 acre-feet for the 17 year period. This decrease can be accounted for by the elimination of diversions during the winter months for hydro-electric power generation at Lahontan Dam.

Public Use

Public use activities on Stillwater are listed under Future Without the Project. The total activity hours projected for Stillwater, assuming activity hours are proportional to wetland area, would be 182,790 for the Proposed Action, 186,280 for the Construction alternatives, and 175,478 for the Land Acquisition alternative. This is an increase of 4 percent under the Proposed Action, and 6 percent under the Construction alternatives over

Future Without the Project conditions, although it is a decrease in public use compared to conditions prior to enforcement of Operating Criteria. Public use activity hours under the Land Acquisition alternative would remain the same as for Future Without the Project. These estimates reflect the change in public use only on the Stillwater wetlands influenced by the quantity of drain water leaving the Reservation. These estimates do not account for the quality of wetlands, the ratio of open water to wetland vegetation, the depth and water quality of the open water areas; or the potential decreases in drain water entering Stillwater from other lands in the Newlands Project due to Operating Criteria.

Public use at Lead Lake on Stillwater is comprised primarily of fishing although some waterfowl hunting does occur. Currently, channel catfish, and brown and black bullheads make up the majority of the sport fishery. According to the "Ten Percent Angler Survey" conducted by the Nevada Department of Wildlife, angler days decreased from 5,315 days in 1980 to 1,145 days in 1986. With the projected decrease in water quality at Lead Lake, a continuing decline in public use is expected with the Proposed Action and Construction alternatives. This potential decline in public use may affect the above listed activity hours for Stillwater.

Public use on the Reservation under the Proposed Action and Land Acquisition alternatives is expected to remain similar to Future Without the Project assuming water rights transfers are approved to maintain the wetlands. Under the Construction alternatives the public use activities centered around wetlands are expected to decrease considerably due to the loss of the large area of contiguous wetlands on Fallon II. Smaller, non-contiguous patches of wetlands would remain, however, it is unlikely that these areas would support waterfowl hunting.

SUMMARY OF IMPACTS

Impacts include changes in the area and quality of wetlands on the Fallon Indian Reservation and Stillwater, an increase in the load and concentration of total dissolved solids, an increase in levels of contaminants in the water entering Stillwater, and changes in withdrawals of water from the Truckee River and Pyramid Lake.

A summary of the primary impacts of the Proposed Action, Construction, and Land Acquisition alternatives upon wetland habitat and the Truckee River is presented in Table 5. Acreages and diversions from the Truckee River under the different alternatives are compared to Future Without the Project. Historic conditions are presented for comparison.

Table 5. Summary of primary impacts on wetland habitat and the Truckee River. Future With the Project conditions, under an unidentified Operating Criteria and Procedures (OCAP) are compared to Future Without the Project conditions with diversion criteria E and an annual allowable diversion of 362,000 acre-feet annually (OCAP).

Habitat Area	Historic (pre-OCAP)	Future Without the Project (with OCAP)		Future With the Project (with OCAP)					
		No Action (Alt. No. 1)		Proposed Action (Alt. No. 2)		Construction (Alt. No.s 3-5)		Land Acquisition (Alt. No. 6)	
		Without F&W Recomm.	With F&W Recomm.	Without F&W Recomm.	With F&W Recomm.	Without F&W Recomm.	With F&W Recomm.	Without F&W Recomm.	With F&W Recomm.
Fallon Indian Reservation									
Fallon I	221	186	186	158 -28	186	175,158,132 -11,-28,-54	186,186,186	158 -28	186
Fallon II	570	570	570	570	570	0 0 0 -570,-570,-570	570,570,570	570	570
Total	791	756	756	728	756	175, 158, 132	756,756,756	728	756
Stillwater Wildlife Management Area (wetland acres)	1,779	546[a]	546[a]	1,078 +532[b]	546[a]	1,332 +786[b]	546[a]	546[a]	546[a]
Truckee River Diversion[c] (acre-feet)	275,000 (1907-1970) 194,170 (1967-1983)	148,400	148,400	160,800 +12,400	148,400	155,100-164,400 +6,700-16,000	148,400	141,900 -6,500	142,600 -5,800
Acquired Lands (acres)	-	-	-	-	-	-	-	d	e

Note: Positive and negative differences between Future Without and Future With the Project conditions are indicated with negative and positive signs,

a) This is the wetland acreage supported by drain water from Fallon I only.
b) The quality of water supporting this additional acreage would be of undesirable quality.
c) The source of the historic diversion values is discussed in the text under Future With the Project, Indirect Impacts section; the Future Without, and Future With the Project diversions are based on an 80-year average (1901-1980) of hydrologic conditions and the Bureau's Truckee-Carson hydrologic model.
d) The quantity of potential wetlands occurring, and those lost, will be determined when parcels are identified for purchase.
e) U.S. Fish and Wildlife Service recommendations will be based upon information addressed in Footnote d.

Approximately 264 acres of wetland habitat on Fallon II was filled or desiccated following the construction of drains in 1982/83. Since that time much of the desiccated area has been connected to a water source and the wetland acreage has fluctuated depending upon water availability. Currently 66 acres of this 264 acre total are receiving water. With the Proposed Action and Land Acquisition alternatives it is expected that approximately 570 acres of wetlands on Fallon II would be maintained. Under the Construction alternatives, however, these wetlands would be lost through desiccation unless specific action is taken to provide these lands with drain water. At this time there is no plan to pump drain water to the wetlands. On Fallon I some of the wetlands would initially be lost due to modernization of the existing irrigation system and development of presently undeveloped lands. Over the 50-year life of the project some of these wetlands would become reestablished due to inefficiencies of the irrigation system. It is estimated that between 11 and 54 acres of wetlands will be permanently lost on Fallon I due to the increased efficiencies of the irrigation systems with the project (Table 5).

Under the Proposed Action and Construction alternatives, lands on Fallon II of the Reservation would be developed into agriculture. Water draining these lands would enter Stillwater. Preliminary water quality data collected by the Bureau of Reclamation (USBR 1987a) and the U.S. Geological Survey (unpublished data) indicate that water from recently constructed drains in Fallon II contain elevated levels of total dissolved solids and several elements.

Due to increases in drain water leaving the Reservation under the Proposed Action and Construction alternatives wetland area and quality in portions of Stillwater would change. Although additional drain water will be available to the wetlands with the project, the water will be of undesirable quality. An increase of approximately 532 acres of poor quality wetlands is projected under the Proposed Action alternative, and an increase of 786 acres of poor quality wetlands under the Construction alternatives (No.s 3-5) (comprising totals of 1,078 and 1,332 acres, respectively) would occur over Future Without the Project conditions. Without adherance to Operating Criteria, water leaving the Reservation supported approximately 1,779 acres of wetlands.

Considering the poor quality of water entering Lead Lake from the Reservation, the recent fish kills, and the potential for additional loads of salt and contaminants with implementation of the Proposed Action and Construction alternatives, it is unlikely the formerly popular bass fishery will be reestablished.

Increased water demands on the Truckee River ranging from 6,700-16,000 acre-feet would be necessary under the Proposed Action and Construction alternatives. These additional demands upon the Truckee River would decrease flows into Pyramid Lake which are needed for habitat of the endangered cui-ui and threatened Lahontan cutthroat trout. With the Land Acquisition alternative

there would be an increase of approximately 6,500 acre-feet into Pyramid Lake annually.

MITIGATION PLANS

Mitigation measures are developed to offset losses of fish and wildlife resources induced by the following alternatives: 1) No Action - including construction to date, 2) Proposed Action, 3) Construction - modernization and expansion of developed lands to irrigate 5440 acres, and 4) Land Acquisition - including construction to date.

The most direct impact of project construction would be upon palustrine emergent wetlands. The Service mitigation policy is "no net loss of in-kind habitat value" for such wetlands.

Mitigation and reduction of wetland habitat losses caused by the various alternatives could be accomplished through a combination of mitigation measures which are based on Service mitigation policy, current information on water quality data, analysis of project impacts, and field observations. Following is a list of appropriate mitigation measures for each alternative, and a discussion of the mitigation measures identified numerically:

A) No Action (Alt. No. 1) - Measure 1

B) Proposed Action (Alt. No. 2) - Measures 2, 4, & 5

C) Construction (Alt. No.s 3-5) - Measures 2, 3, 4, & 5

D) Land Acquisition (Alt. No. 6) - Measures 1, 4, & 5

1) Cessation of drainage of Fallon II and the subsequent elimination of the drain water in the completed TJ drain system. This could be accomplished by filling the A, TJ-1, and TJ drains.

2) Prevent water draining off newly developed agricultural lands from reaching the Stillwater Wildlife Management Area. Develop a drain water disposal system on the Reservation which will not attract migratory birds. Fill the A, TJ-1, and TJ drains with earth.

3) Purchase additional lands in Lahontan Valley with water rights and transfer the beneficial use of these rights to support high quality wetlands in Lahontan Valley near major existing wetlands. This acreage should be equivalent to the wetland acreage existing on Fallon II in 1980 prior to project construction (about 570 acres).

4) Purchase additional lands in Lahontan Valley with water rights and transfer the beneficial use of these rights to reestablish wetlands lost on Fallon I due to the increased

efficiencies of the irrigation systems. Losses would occur with the Proposed Action, Construction, and Land Acquisition alternatives.

5) Purchase water rights for transfer to the lower Truckee River (below Derby Dam) and Pyramid Lake to fully mitigate the 6,700-16,000 acre-feet of water that would be lost from the Truckee River due to the Proposed Action and Construction alternatives.

RECOMMENDATIONS

Land Acquisition Alternative

We recommend that the Land Acquisition alternative be considered as the preferred alternative. Implementation of this alternative would prevent further degradation of wetlands at Stillwater caused by contaminated drain water. About 6,500 acre-feet of Truckee River water would be saved. This is a theoretical savings assuming that the unused balance of the Tribe's water entitlement on the Reservation (7,595 acre-feet) will not be utilized. This water entitlement could be transfered to Pyramid Lake.

Eliminate the entire drainage system excavated in anticipation of this project. The plan would include the A, TJ-1, and TJ drains. Elimination could be achieved by filling the drains and restoring the original contour of the land.

Proposed Action, Construction, and Land Acquisition Alternatives

We recommend the following measures be incorporated into and made part of any selected construction project on the Reservation to mitigate aquatic and terrestrial resources:

Purchase additional water rights on lands in Lahontan Valley to develop and maintain high quality wetlands equivalent to the wetland areas lost on Fallon I due to project construction.

Dispose of irrigation drain water on the Fallon Indian Reservation. The disposal repository should be designed so that migratory birds will not be attracted to the site. Eliminate the TJ drain downstream from the Reservation.

No Action Alternative

Eliminate the entire drainage system excavated in anticipation of this project. The plan would include the A, TJ-1, and TJ drains. Elimination could be achieved by filling the drains and restoring the original contour of the land.

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Plant species checklist for the Fallon Indian Reservation, adjacent to the Stillwater Wildlife Management Area.

AQUATIC PLANTS

Algae (Aphanizomenon)
Alkali bulrush (Scirpus robustus)
*American pondweed (Potamogeton nodosus)
Arrowhead (Sagittaria sp.) *(Sagittaria latifolia)
*Bacopa (Bacopa Eisenii)
Baltic rush (Juncus balticus)
Bladderwort (Utricularia vulgaris)
*Cattail (Typha latifolia)
Common reed (Phragmites communis)
Coontail (Ceratophyllum demersum)
Curleyleaf pondweed (Potamogeton crispus)
*Duckweed (Lemna minor)
*Hardstem bulrush (Scirpus acutus)
Horned pondweed (Zannichellia palustris)
Muskgrass (Chara sp.)
Narrow-leaved cattail (Typha angustifolia)
Pepperwort (Marsilea mucronata)
*Sago pondweed (Potamogeton pectinatus)
*Smartweed (Polygonum Persicaria)
Spikerush (Eleocharis sp.)
Three-square bulrush (Scirpus americus)
*Water fern (Azolla mexicana)
Western pondweed (Potamogeton filiformis)
Widgeongrass (Ruppia maritima)

SHRUBS

Sagebrush (Artemesia sp.)
Dalea (Psorothamnus polydenius)
Four-wing saltbush (Atriplex canescens)
*Greasewood (Sarcobatus vermiculatus)
Horsebrush (Tetradymia tetrameres)
Iodine weed (Suaeda torreyana torreyana)
Pickleweed (Allenrolfea occidentalis)
Quailbush (Atriplex lentiformis)
*Rabbitbrush (Chrysothamnus nauseosus)
Shadscale (Atriplex confertifolia)
*Salt cedar (Tamarix pentandra)
*Willow (Salix sp.)

TREES

*Cottonwood (Populus fremontii)
*Russian olive (Shepherdia argentea)

GRASSES

Barnyard grass (Echinochloa crusgalli)
Beardless wildrye (Elymus triticoides)

Foxtail barley (Hordeum jubatum)
Foxtail grass (Setaria viridis)
Indian rice grass (Oryzopsis hymenoides)
Rabbitsfoot grass (Polypogon monspeliensis)
*Saltgrass (Distichlis spicata stricta)

HERBS

Alkali mallow (Sida hederacea)
Aster (Aster eatonii)
Aster (Aster frondosus)
Austrian peaweed (Sphaerophysa (Swainsonia) salsula))
Bassia (Echinopsilon hyssopifolius)
Buttercup (Ranunculus cymbalaria)
Cocklebur (Xanthium canadense)
Curly dock (Rumex crispus)
Dandelion (Taraxacum officinale)
Goldenrod (Solidago occidentalis)
Goosefoot (Chenopodium glaucum)
Gum plant (Grindelia squarrosa)
Mares tail (Conyza canadensis)
Milkweed (Asclepias speciosa)
Narrow-leaf milkweed (Asclepias fascicularis)
N.C.N. (Atriplex heterosperma)
N.C.N. (Monolepis pusilla)
Poverty weed (Iva axillaris)
Russian knapweed (Centaurea repens)
Russian thistle (Salsola paulsenii)
Stick-tight (Bidens frondosa)
Strawberry clover (Trifolium fragiferum)
Thistle (Cirsium sp.)
Water-horehound (Lycopus lucidus)
White sweet clover (Melilotus alba)
White top (Cardaria pubescens)

*Dominant plant varieties in each vegetative community on the Fallon Indian Reservation

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Bird species checklist for the Stillwater Wildlife Management Area adjacent to the Fallon Indian Reservation.

LOONS

*Common Loon (Gavia immer)

GREBES

Horned Grebe (Podiceps auritus)
*Eared Grebe (Podiceps nigricollis)
*Western Grebe (Aechmophorus occidentalis)
*Pied-billed Grebe (Podilymbus podiceps)

PELICANS

White Pelican (Pelecanus erythrorhynchos)

CORMORANTS

Double-crested Cormorant (Phalacrocorox auritus)

HERONS AND BITTERNS

*Great Blue Heron (Ardea herodias)
*Great Egret (Casmerodius albus)
*Snowy Egret (Egretta thula)
*Black-crowned Night Heron (Nycticorax nycticorax)
Least Bittern (Ixobrychus exilis)
*American Bittern (Botaurus lentiginosus)

IBISES

*White-faced Ibis (Plegadis chihi)

WATERFOWL

Tundra Swan (Cygnus columbianus)
*Canada Goose (3 races) (Branta canadensis)
White-fronted Goose (Anser albifrons)
Snow Goose (Chen caerulescens)
Ross' Goose (Chen rossii)
*Mallard (Anas platyrhynchos)
*Gadwall (Anas strepera)
*Pintail (Anas acuta)
*Green-winged Teal (Anas crecca)
*Blue-winged Teal (Anas discors)
*Cinnamon Teal (Anas cyanoptera)
*American Wigeon (Anas americana)
*Northern Shoveler (Anas clypeata)
*Wood Duck (Aix sponsa)

*Redhead (Aythya americana)
Ring-necked Duck (Aythya collaris)
*Canvasback (Aythya valisineria)
Greater Scaup (Aythya marila)
Lesser Scaup (Aythya affinis)
Common Goldeneye (Bucephala clangula)
Bufflehead (Bucephala albeola)
Surf Scoter (Melanitta perspicillata)
*Ruddy Duck (Oxyura jamaicensis)
Hooded Merganser (Lophodytes cucullatus)
Common Merganser (Mergus merganser)

VULTURES, HAWKS AND FALCONS

Turkey Vulture (Cathartes aura)
Sharp-shinned Hawk (Accipter striatus)
Cooper's Hawk (Accipter cooperii)
*Red-tailed Hawk (Buteo jamaicensis)
*Swainson's Hawk (Buteo swainsoni)
Rough-legged Hawk (Buteo lagopus)
Ferruginous Hawk (Buteo regalis)
Golden Eagle (Aquila chrysaetos)
Bald Eagle (Haliaeetus leucocephalus)
*Northern Harrier (Circus cyaneus)
Prairie Falcon (Falco mexicanas)
American Kestrel (Falco sparverius)

GALLINACEOUS BIRDS

*California Quail (Callipepla californica)
*Ring-necked Pheasant (Phasianus colchicus)

RAILS

*Virginia Rail (Rallus limicola)
*Sora Rail (Porzana carolina)
*Common Moorhen (Gallinula chloropus)
*American Coot (Fulica americana)

PLOVERS

Semi-palmated Plover (Charadrius semipalmatus)
*Snowy Plover (Charadrius alexandrinus)
*Killdeer (Charadrius vociferus)
Black bellied Plover (Pluvialis squatarola)

SHOREBIRDS

Common Snipe (Gallinago gallinago)
*Long-billed Curlew (Numenius americanus)
*Spotted Sandpiper (Actitis macularia)
Solitary Sandpiper (Tringa solitaria)

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Willet (Catoptrophorus semipalmatus)
Greater Yellowlegs (Tringa melanoleuca)
Lesser Yellowlegs (Tringa flavipes)
Least Sandpiper (Calidris minutilla)
Dunlin (Calidris alpina)
Long-billed Dowitcher (Limnodromus scolopaceus)
Western Sandpiper (Calidris mauri)
Marbled Godwit (Limosa fedoa)
Sanderling (Calidris alba)
American Avocet (Recurvirostra americana)
*Black-necked Stilt (Himantopus mexicanus)
*Wilson's Phalarope (Phalaropus tricolor)
Northern Phalarope (Phalaropus lobatus)

GULLS AND TERNS

California Gull (Larus californicus)
Ring-billed Gull (Larus delawarensis)
Bonaparte's Gull (Larus philadelphia)
*Forster's Tern (Sterna forsteri)
Caspian Tern (Sterna caspia)
*Black Tern (Chlidonias niger)

DOVES

*Mourning Dove (Zenaida macroura)

OWLS

Barn Owl (Tyto alba)
Western Screech Owl (Otus kennicottii)
Great Horned Owl (Bubo virginianus)
*Burrowing Owl (Athene cunicularia)
*Long-eared Owl (Asio otus)
*Short-eared Owl (Asio flammeus)

GOATSUCKERS

Common Nighthawk (Chordeiles minor)

KINGFISHERS

Belted Kingfisher (Ceryle alcyon)

WOODPECKERS

*Common Flicker (Colaptes auratus)
*Downy Woodpecker (Picoides pubescens)

FLYCATCHERS

Western Kingbird (Tyrannus virticalis)

Ash-throated Flycatcher (Myiarchus cinerascens)
*Say's Phoebe (Sayornis saya)
Western Wood Pewee (Contopus sordidulus)
Olive-sided Flycatcher (Contopus borealis)

LARKS

Horned Lark (Eremophila alpestris)

SWALLOWS

Violet-green Swallow (Tachycineta thalassina)
Tree Swallow (Tachycineta bicolor)
*Northern Rough-winged Swallow (Stelgidopteryx serripennis)
*Barn Swallow (Hirundo rustica)
*Cliff Swallow (Hirundo pyrrhonota)

CROWS AND JAYS

*Black-billed Magpie (Pica pica)
*Common Raven (Corvus corax)
*American Crow (Corvus brachyrhynchos)

CHICKADEES

Mountain Chickadee (Parus gambeli)
*Bushtit (Psaltriparus minimus)

WRENS

*Bewick's Wren (Thryomanes bewickii)
*Marsh Wren (Cistothorus palustris)

MOCKINGBIRDS AND THRASHERS

Mockingbird (Mimus polyglottos)
*Sage Thrasher (Oreoscoptes montanus)

THRUSHES

American Robin (Turdus migratorius)
Western Bluebird (Sialia mexicana)
Mountain Bluebird (Sialia currucoides)
Townsend's Solitaire (Myadestes townsendi)

KINGLETS

Ruby-crowned Kinglet (Regulus calendula)

PIPITS

Water Pipit (Anthus spinoletta)

WAXWINGS

Cedar Waxwing (Bombycilla cedrorum)

SHRIKES

Northern Shrike (Lanius excubitor)
*Loggerhead Shrike (Lanius ludovicianus)

STARLINGS

*Starling (Sturnus vulgaris)

WARBLERS

Orange-crowned Warbler (Vermivora celata)
Yellow Warbler (Dendroica petechia)
Yelow-rumped Warbler (Dendroica coronata)
MacGillivray's Warbler (Oporornis tolmiei)
*Common Yellowthroat (Geothlypis trichas)
*Yellow-breasted Chat (Icteria virens)

WEAVER FINCHES

*House Sparrow (Passer domesticus)

MEADOWLARKS AND BLACKBIRDS

Western Meadowlark (Sturnella neglecta)
*Yellow-headed Blackbird (Xanthocephalus xanthocephalus)
*Red-winged Blackbird (Agelaius phoeniceus)
*Northern Oriole (Icterus galbula)
*Brewer's Blackbird (Euphagus cyanocephalus)
*Brown-headed Cowbird (Molothrus ater)

TANAGERS

Western Tanager (Piranga ludoviciana)

GROSBEAKS, SPARROWS AND FINCHES

*Black-headed Grosbeak (Pheucticus melanocephalus)
*House Finch (Carpodacus mexicanus)
American Goldfinch (Carduelis tristis)
Rufous-sided Towhee (Pipilo erythrophthalmus)
*Savannah Sparrow (Passerculus sandwichensis)
Lark Sparrow (Chondestes grammacus)
Black-throated Sparrow (Amphispiza bilineata)
Sage Sparrow (Amphispiza belli)
Dark-eyed Junco (Junco hyemalis)
Chipping Sparrow (Spizella passerina)
Brewer's Sparrow (Spizella breweri)
White-crowned Sparrow (Zonotrichia leucophrys)
*Song Sparrow (Melospiza melodia)

*Birds that nest locally

Mammals of the Stillwater Wildlife Management Area, adjacent to the Fallon Indian Reservation, listed by family.

CANIDAE

Coyote (Canis latrans)
Kit fox (Vulpes macrotis)

CAPROMYIDAE

Nutria (Myocastor coypus)

CASTORIDAE

Beaver (Castor canadensis)

CERVIDAE

Mule deer (Odocoileus hemionus)

CRICETIDAE

Bushytail woodrat (Neotoma cinerea)
Desert woodrat (Neotoma lepida)
Deer mouse (Peromyscus maniculatus)
Mountain vole (Microtus montanus)
Muskrat (Ondatra zibethica)
Northern grasshopper mouse (Onychomys leucogaster)
Pinon mouse (Peromyscus truei)
Western harvest mouse (Reithrodontomys megalotis)

ERETHIZONTIDAE

Porcupine (Erethizon dorsatum)

FELIDAE

Bobcat (Lynx rufus)

GEOMYIDAE

Valley pocket gopher (Thomomys bottae)

HETEROMYIDAE

Desert kangaroo rat (Dipodomys deserti)
Great Basin kangaroo rat (Dipodomys microps)
Little pocket mouse (Perognathus longimembris)
Merriam kangaroo rat (Dipodomys merriami)

Ord kangaroo rat (Dipodomys ordi)
Pale kangaroo mouse (Microdipodops pallidus)

LEPORIDAE

Blacktail jackrabbit (Lepus californicus)
Mountain cottontail (Sylvilagus nuttalli)

MURIDAE

House mouse (Mus musculus)

MUSTELIDAE

Badger (Taxidea taxus)
Longtail weasel (Mustela frenata)
Mink (Mustela vison)
Spotted skunk (Spilogale putorius)
Striped skunk (Mephitis mephitis)

PROCYONIDAE

Racoon (Procyon lotor)

SCIURIDAE

Townsend ground squirrel (Citellus townsendi)
Whitetail antelope squirrel (Ammospermophilus leucurus)

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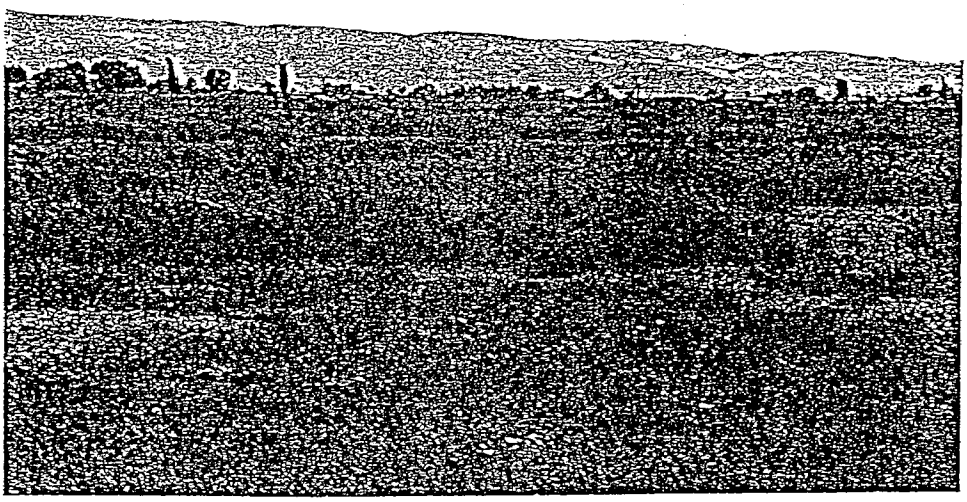
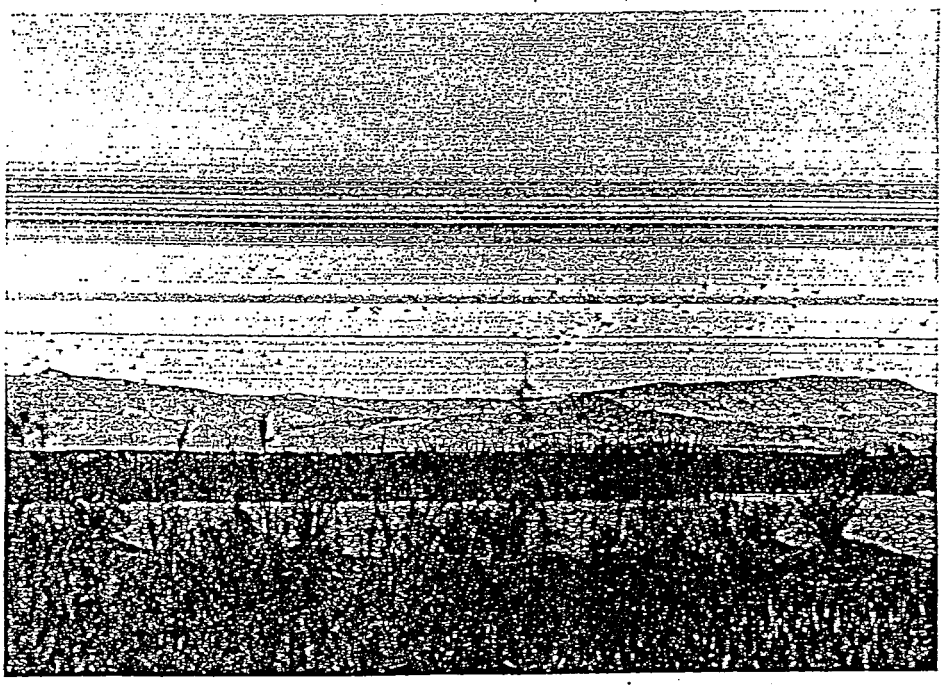


1. "Prime" wetlands in T. 19 N., R. 30 E., section 3 of the Fallon Indian Reservation during the summer of 1987 (representative of most years in the past).

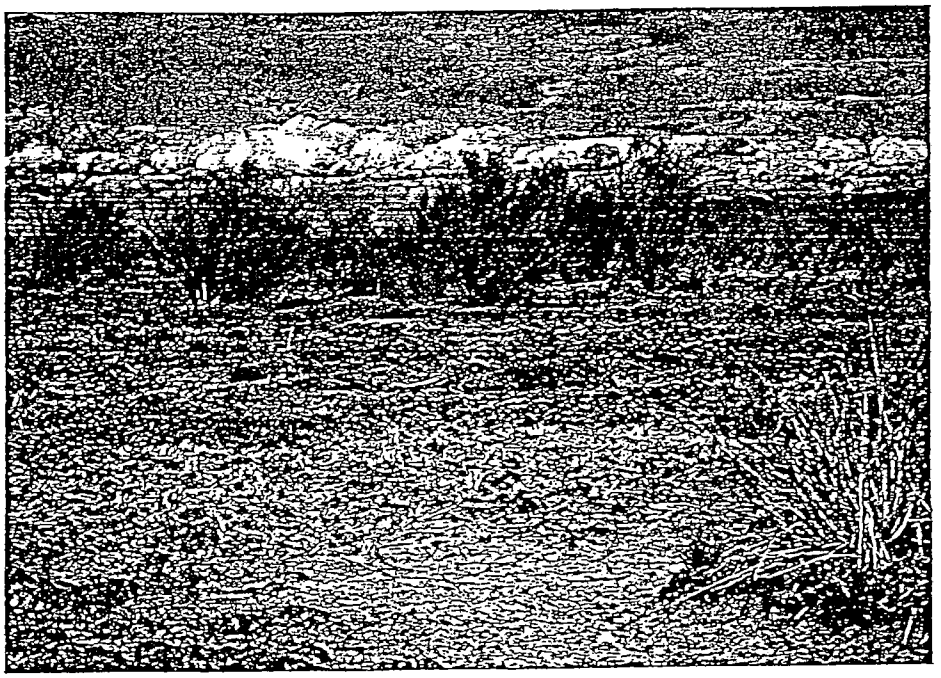
2. "Prime" wetlands in T. 19 N., R. 30 E., section 3 of the Fallon Indian Reservation during the summer of 1987 (representative of most years in the past).

3. Palustrine emergent wetland community (categorized as "prime") in the Fallon II portion of the Reservation.

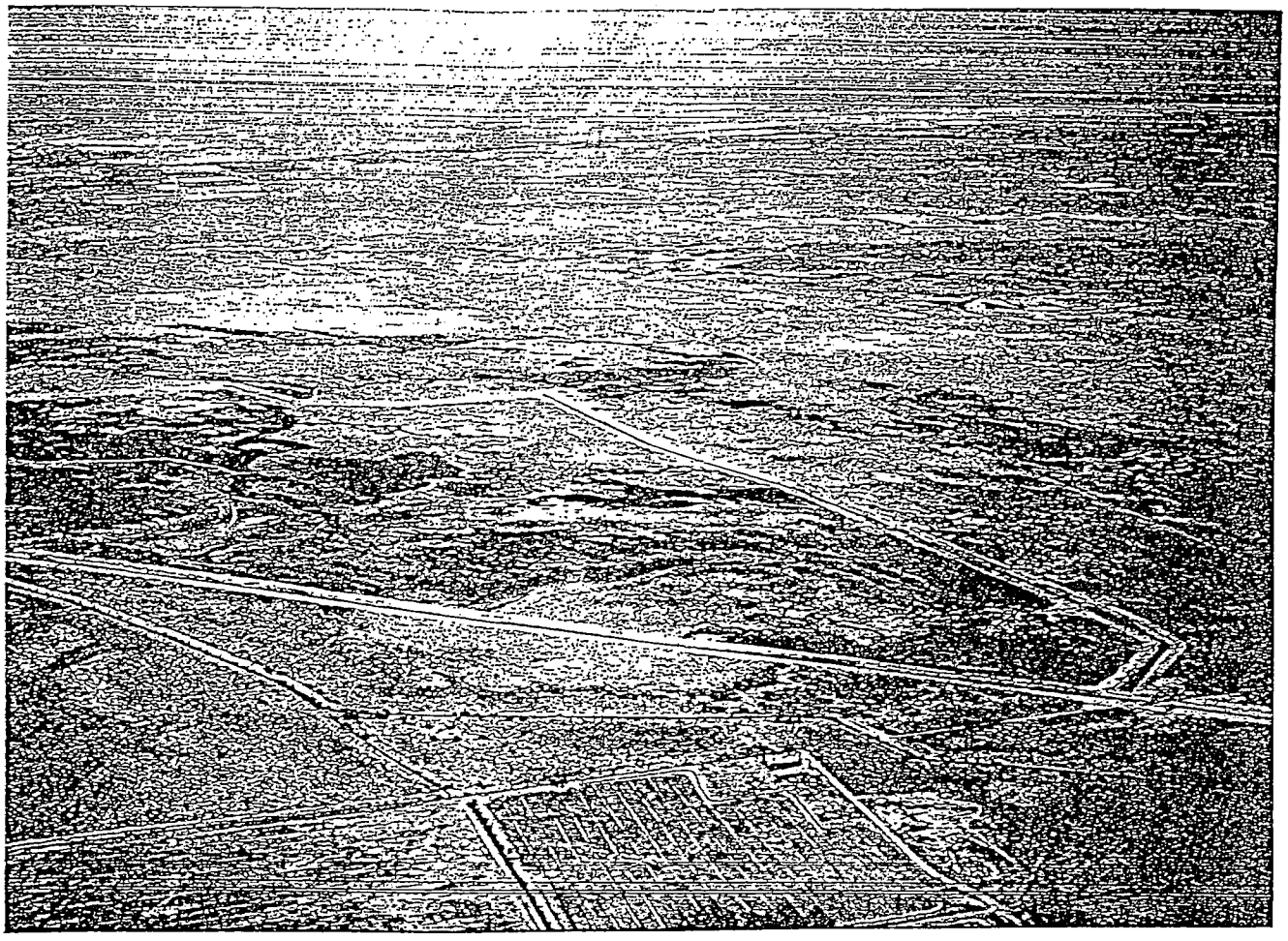


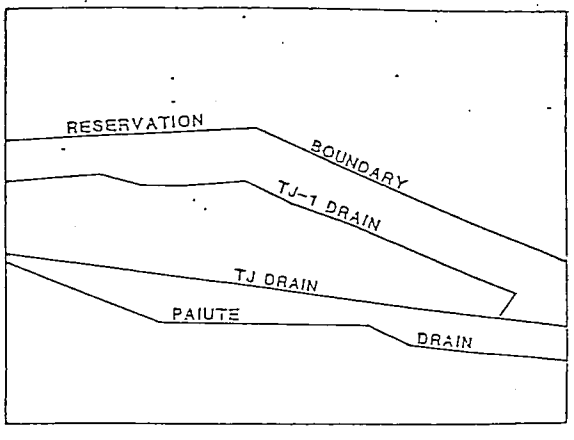
4. Palustrine emergent wetland community (categorized as "prime") in the Fallon II portion of the Reservation. Note waterfowl in flight.

5. Palustrine emergent wetlands categorized as "good."



6. Area that was previously flooded. Note dead cattail stubble.





7. Aerial view (looking west) of the northern portion of the Fallon Indian Reservation wetlands. The diagram depicts the drains and Reservation boundary in the photograph. Note the wetlands and open water areas immediately north and west of the TJ-1 drain. The wetlands north of the boundary are part of Stillwater.